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TREATMENT OF FOUR HUNDRED AND TWENTY INFECTED WOUNDS UNDER BATTLE CON- DITIONS ARRIVING ON THE AVERAGE OF FIFTY-EIGHT AND ONE THIRD HOURS AFTER INJURY WITHOUT PREVIOUS SURGICAL TREATMENT

BY THE SURGICAL STAFF OF THE LAKESIDE UNIT

REPORTED BY LIEUTENANT-COLONEL G. W. CRILE

INTRODUCTION

THIS is a report of a "group research" by the Lakeside Unit on the treatment of infected wounds at a base hospital during a battle. This work was made possible through the necessary authorization by General Burtschaell; the co-operation of General Bowlby; the advice of Colonel Gask and Colonel Elder; and the co-operation of the D.D.M.S., Colonel Meek. The surgical work was performed by Captains Rogers, Graham, Barney, and Brock, and Lieutenants Harrison, Jackson, Thompson, Sherry, Hinton, and Meader; the pathological work by Lieutenant Richardson.*

The Problem. In this series, the patients were on the operating table for their first surgical treatment on an average of fifty-eight and one-third hours after injury—the shortest period being twenty-four hours, and longest one hundred and fifty hours. As it developed, our problem was this: What can be done to reclaim the in-

NOTE.—Each Medical Officer on the surgical division of the hospital had an equal share in this work, and the results are therefore such as might reasonably be expected at any well-organized and properly-supervised base hospital in France.—J. M. Elder.

fectured wounds exclusive of the head and chest and abdomen, arriving for the first surgical treatment on the fifty-eighth and one-third hour after injury? To be useful in the military sense, any plan must be limited to the equipment and personnel of a standard military hospital; it must be an everyday method; and must be adapted to battle conditions. At the fifty-eighth hour, the wound presented heat, swelling, tenderness, redness, and a discharge of purulent fluid; in this series, the wounds have been surgically untouched, undrained, not packed, but dressed and left to natural defenses up to the time of arrival.

SURGICAL MANAGEMENT

1. There were four operating tables at which
2. Two surgeons operated during eight-hour periods, leaving time for each surgeon personally to supervise the after care of his patients, to keep his records, to secure rest, and to return refreshed for his next turn at the table.
3. The daily turnover was just over one hundred operations during the acute period.
4. Every patient was examined on the table by his surgeon before anaesthesia.
5. All operations were performed on the ordinary ambulance stretcher.
6. Nurse assistants and nurse anaesthetists were employed.
7. All operative cases were prepared under anaesthesia by
 - (a) Scrubbing thoroughly a wide field with soap and water;
 - (b) Shaving;
 - (c) 5 per cent. sodium carbonate;
 - (d) Ether;
 - (e) Alcohol.(Captain Barney recently introduced sodium carbonate as a supplement to soap and scrubbing.)
8. The limb and the wounds were handled with the same care during anaesthesia as before anaesthesia.
9. Every wound that had not progressed to abscess and new tissue formation was treated by complete surgical revision.
10. In large wounds, no attempt was made to excise *en bloc* within the line of uninfected tissue, but the devitalized tissue was dealt with in an opportunist manner.
11. But little skin was excised.
12. Ample exposure was always made, usually by vertical incisions.

13. After surgically meeting the indication for to-day—namely, complete revision—the “to-morrow” of the wound was considered, and certain cases were treated by

14. Incision of fascia overlying swollen muscles; incision of the skin and superficial fascia, placed where it seemed certain that within the first and second post-operative days swelling and tension would appear; that is, the operation that was anticipated as being necessary day after to-morrow was done now, but owing to these anticipatory or prophylactic incisions, little or no swelling occurred later. In other words, the surgeon aimed to take and to hold the initiative.

15. When completed, the wound was flat and soft and anticipatory—the obstacles to its biologic defence had been removed. When the wound was surgically completed, it contained many bacteria. The bacteria were facing not the normal antagonism of living tissue, but the heightened antagonism of tissue whose emergency defense had been called out by the adequate stimulus of the injury and the bacteria. The wound was in the state of a heightened defense clinically, so well known in the two-stage operation in civil surgery. There was active phagocytosis and increased blood supply everywhere; and the infecting bacteria had not gained virulence by selective struggle against antiseptics—a principle established for protozoa and recognized clinically for infection.

Having completed the revision, what shall be done with the wound, taking into account battle conditions?

We tested five plans, each applicable to rush periods, each surgeon dividing his cases among the five plans as follows:

1. Surgery, plus dry gauze dressing—no antiseptics.
2. Flavine.
3. Dichloramin-T chlorcosane.
4. Wright's hypertonic pack.
5. Alcohol.

Although recognizing the sterling merits of Carrel-Dakin, we did not use it because we were testing only those methods available for rush periods. We did not use “B.I.P.” because we hoped in suitable cases to do delayed primary suturing.

GENERAL STATEMENT AND CLINICAL RESULTS

1. In the period there were admitted twelve hundred and seventy-four patients.

2. Of these, six hundred and sixty were walkers, and six hundred and fourteen were stretchers.

3. Of the six hundred and fourteen stretcher cases, one hundred and ninety-four required no operation, because they were medical cases, or because the wounds were taking care of themselves, and four hundred and twenty required operation.

4. Of the four hundred and twenty operative cases, sixty-seven were marked for delayed primary suture; forty-four superficial wounds were immediately sutured.

5. Of the forty-four immediate sutures, all were successful; of the successful cases, there were two fractured humeri and one fractured radius.

6. Of the sixty-seven delayed primary sutures, 91 per cent. healed without requiring removal of any stitches; 6.1 per cent. were partial successes; 2.9 per cent. were failures.

7. Among the total number, ninety-three were compound fractures.

8. There were four, or 0.9 per cent. deaths.

9. There was no case of bacteriæmia or septicæmia.

10. No case was rejected for operation because it was thought that the infection had gone too far.

11. The patients not suitable for delayed suture were quickly ready for evacuation, as seen by the chart.

12. The comparative results in the various types of treatment are well indicated by the charts showing composite temperature curve of the cases treated by

(a) Plain surgery—dry gauze—no antiseptics.

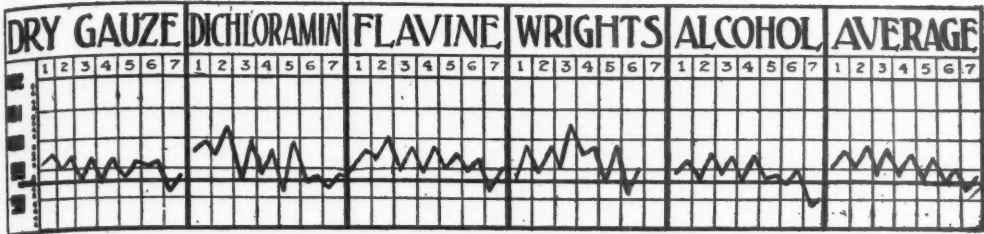
(b) Dichloramin-T chlorcosane.

(c) Flavine.

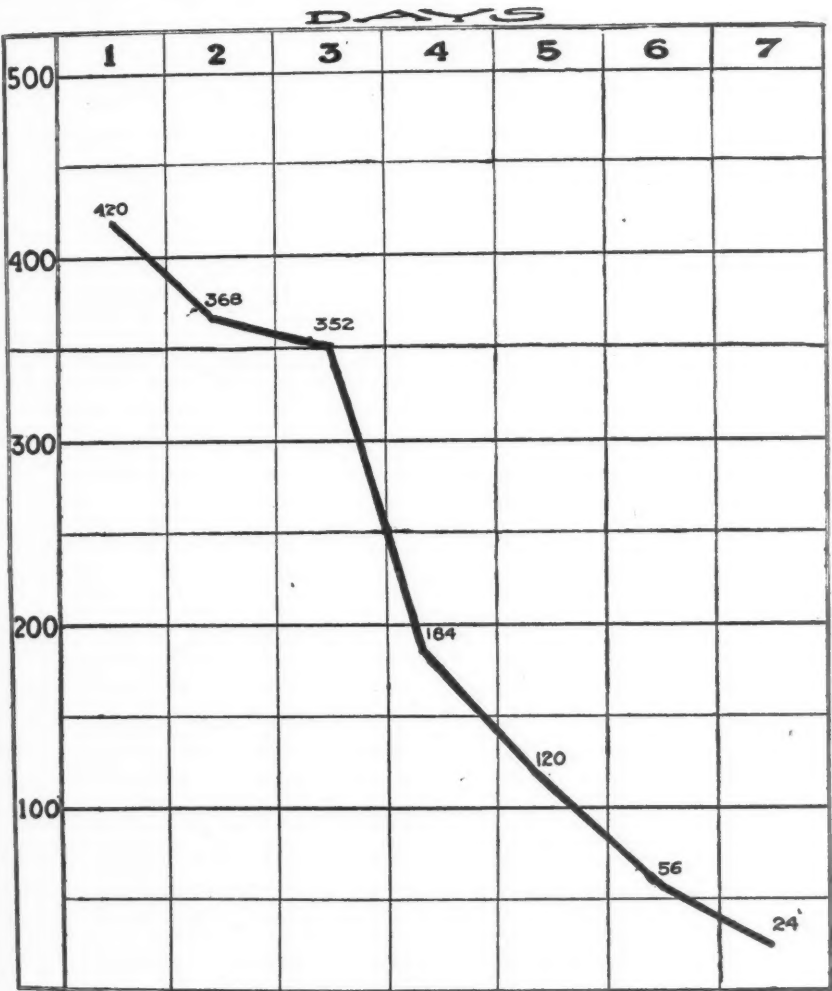
(d) Wright's hypertonic pack.

(e) Alcohol.

From the foregoing it would appear that surgical revision of wounds untreated for fifty-eight and one-third hours causes no harm and does much good. It is felt that with further experience a greater percentage of delayed infected wounds including compound fractures, will be closed both primarily and delayed. The mechanism by which this benefit follows will be further discussed later; that the presence or the absence of chemical antiseptics made no notable impression on the clinical course after operation. This point will be considered further. These results are a tribute to the judgment of the surgeons in the forward area who selected the cases for evacuation without operation—and who elected to pack no gauze, insert no drainage tubes into these wounds, but merely dressed them.



COMPOSITE TEMPERATURE CHARTS
420 operations



EVACUATION
of cases operated

MECKEL'S DIVERTICULUM—REPORT OF CASES CAUSING INTESTINAL OBSTRUCTION

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FITZ¹ says "The pouch-like formation of intestine occasionally seen projecting from the lower part of the ileum is universally known as Meckel's diverticulum, not that this distinguished anatomist was its discoverer, for early in the eighteenth century, Ruysch² presented an admirable illustration of this formation. Its frequent congenital nature was also recognized before the time of Meckel, and it seems probable that suggestions relative to its origin from the vitelline duct had been presented previous to the publication of this investigator in 1812³."

In order to state clearly ways in which Meckel's diverticulum may cause intestinal obstruction, a short statement of its embryology will be helpful. This process is an unobliterated portion of the omphalomesenteric or vitelline duct. In Cullen's new work on the umbilicus will be found most excellent illustrations showing the various stages in the embryonic development which should normally result in a complete obliteration of this structure.

When the gastro-intestinal tract first shows signs of development from the yolk sac, the communication is very wide. However, as the development proceeds, the entrance of the sac into the body is considerably narrowed and then becomes definitely the vitelline or the omphalomesenteric duct. The reason for the narrowing of this communication is because of the increase in size of the embryo and the amnion without any appreciable enlargement of the yolk sac; thus the latter is shoved away from the former. The structures forming the body stalk, namely, the allantois, the umbilical arteries and veins, enter the body at the same site as the vitelline duct. The two, while not fused at an early date, represent the first stage of a true umbilical cord. As the amnion and foetus enlarge, these structures are lengthened and while outside the amniotic cavity they are separate, inside, they are held together by a sheath of amnion.

In an embryo five mm. long, the first piece of small intestine is differentiated, and from its convex border runs the vitelline duct. This communication, generally speaking, disappears when the embryo is between four and twelve mm. long. The vessels, however, persist long after this communication is cut off.

Despite the fact that this is what normally occurs, we may have various combinations of attachments and patencies of the duct. Eisendrath's⁴ classification is as follows: (1) Canal persists at both ends. (2) Canal persists at both ends, the centre forming a cystome. (3) Canal persistent at the umbilicus. (4) Canal persistent at the ileum. (5) Cord attached to umbilicus and not to the ileum. (6) Cord with no lumen attached to umbilicus and ileum.

The commonest site is about twelve to twenty-four inches above the ileo-caecal valve⁵, but cases have been reported by Forester⁶ in situations varying from the valve to four feet above it. The length may vary greatly, but has been placed at a minimum of ten inches. There may be a wide variation in the lumen from the size of the ileum to a lumen scarcely discernible. The specimens shown illustrate this very well, and in addition one has the unusual condition of hernial protrusions or cystic dilatation of the tip. It may or may not have a mesentery; in the latter case it derives its blood supply from the intestine.

The cases in this report show different types of diverticula, which cause obstruction.

Case 1. Where a patent diverticulum was attached only to the ileum.

Case 2. Where a patent diverticulum was attached to the ileum and to the mesentery of the ileum.

Case 3. Where a patent diverticulum was attached to the ileum and to an abdominal tumour.

Case 1. E. T., English, married, aged forty-five years, admitted to Toronto General Hospital complaining of pain in the right iliac region for eight days.

Ever since the first child was born sixteen years ago, patient has had more or less discomfort in the right iliac region. Eight days ago was suddenly seized with abdominal pain which lasted for three days accompanied by vomiting; the pain moderated after this time and left just a dull soreness slightly tender on pressure. Patient has never had any other serious illnesses. Menstruation has been regular every twenty-eight days, lasting three or four days.

On admission. Fairly healthy looking female, well developed, teeth had well marked pyorrhœa, tongue heavily coated, breath

very foul, temperature 102.2° , pulse 100. Abdomen fairly flat and lax, no visible peristalsis; on palpation a mass could be felt in the right iliac fossa the size of an orange. There was very slight increase in the muscular rigidity on the right side with some tenderness on palpation. Vaginal examination confirmed the presence of a mass, but uterus and adnexa freely moveable independent of the mass. There has been no gastric distress for six days. Urinalysis showed nothing abnormal, the white blood count was 24,000. A diagnosis of an appendiceal abscess was made and operation advised.

Operation. An incision was made over the mass, the intestines packed off and a large appendiceal abscess drained. The appendix had amputated itself about the middle, the two portions were removed and drainage established.

Progress. For the next three days the patient progressed favorably, the temperature varying between 99° and 99.4° , with the pulse around 100. There was some abdominal distension, which, however, was relieved by enemas. On the evening of the third day the distension increased and while it was possible to secure the passage of some flatus with enemas, it did not entirely relieve the condition. Later that evening the patient began to vomit and there was a slight increase in pulse rate. There was no definite tenderness except in the right iliac fossa; there was no extending abdominal rigidity that would suggest a spreading peritonitis; there was no increased elevation of temperature. The white blood count showed 12,000 leucocytes. The patient's condition became progressively more grave, but the abdominal distension never became extreme, no muscular rigidity developed, no increased elevation of temperature, no increased leucocytosis, enemas always resulting in the passage of a small amount of flatus. Operation was discussed, but as the most likely diagnosis was one of ileus paralyticus, it was considered inadvisable, particularly in view of the fact that enemas always resulted in the passage of small amounts of flatus. The pulse rate increased and the vomiting persisted, and in spite of our best efforts, the patient died a week after admission.

Post-mortem. On opening the abdomen the small intestines were found distended with no evidence of inflammation in the general peritoneal cavity. The original abscess cavity was nearly obliterated, containing about 30 c.c. of sero-saneous fluid. However, at a point eighteen inches from the ileo-cæcal valve there was a volvulus (Fig. 1) of the ileum produced by a Meckel's Diverticulum which had caused almost a complete obstruction. The illustration will explain this much better than I can describe it.

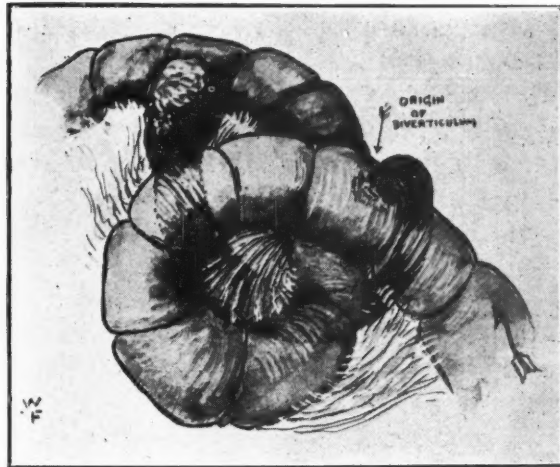


FIG. 1

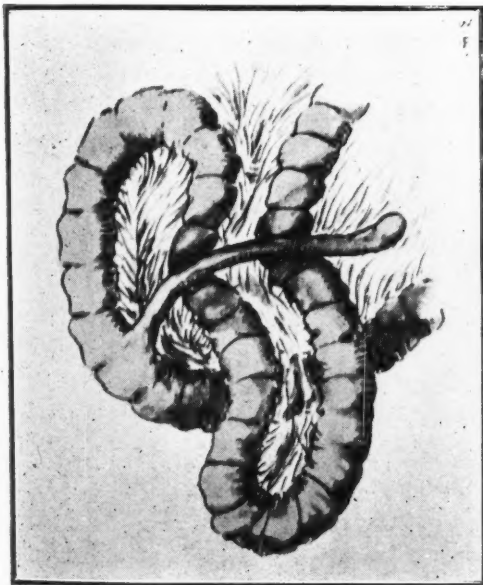


FIG. 2

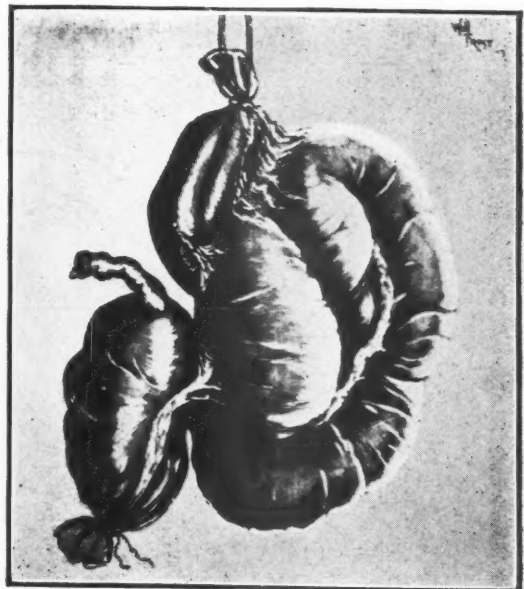


FIG. 3



Case 2. Miss J. R., admitted to Toronto General Hospital, October 9th, 1916, under Dr. F. N. G. Starr, complaining of pelvic pain.

For the last two years the patient had complained of severe pain in the back, and a feeling of weight in the lower abdomen. She had never had any other severe illnesses.

She was a poorly nourished female, very anæmic, weighing about one hundred and eighteen pounds, teeth showed slight pyorrhœa.

Abdominal examination revealed nothing abnormal, vaginal examination revealed a cervical polyp and a marked retroversion. On October 10th, the patient was submitted to operation; the cervical polyp was removed, the uterus curetted, the retroversion was corrected and the appendix was removed.

The progress after the operation was uneventful for ten days, when a good deal of abdominal distension occurred. This was largely relieved by enemas. On the eleventh day the pulse rate increased and the patient was nauseated. Enemas still succeeded in expelling flatus but in successfully smaller amounts. The distension became quite severe, the nausea increased and the pulse rate reached 120. On palpating the abdomen, tense coils of small bowel could be felt, but no muscular rigidity. A tentative diagnosis of small bowel obstruction was made, and operation advised.

Operation. On opening the abdomen, tense coils of bowels presented, the sigmoid and cæcum were both collapsed. On searching, coils of small bowel were found collapsed, and on tracing them along it was seen that they herniated under a Meckel's diverticulum which was attached to the convex border of the ileum and to the superior aspect of its mesentery as shown in Fig. 2. The mesenteric attachment of the diverticulum was freed and the obstruction was relieved. The diverticulum was then amputated at the ileal attachment and the stump invaginated as in dealing with appendix stump. The abdomen was filled with normal salt solution and closed in layers. The bowels moved that evening, expelling a great deal of flatus, but the pulse became worse and the patient succumbed twenty-four hours later.

Case 3. Mrs. A. W., aged thirty-five years, referred to Dr. F. N. G. Starr by Dr. E. J. Free, of Campbellford, was admitted to the Toronto General Hospital, November 31st, 1916, complaining of abdominal swelling.

For the past few months the patient had noticed an increase in the size of the abdomen accompanied by nausea and obstinate

constipation. She had a variable appetite, was very anæmic and appeared very ill nourished. She had her appendix removed two years ago and has a ventral hernia resulting. Menses regular and normal. She has had no other serious illnesses.

On abdominal palpation a large mass was felt arising from the left iliac fossa and extending midway between the umbilicus and the ensiform; it was dull on percussion. A thrill was transmitted and it fluctuated. Per vaginam, a mass was felt filling the whole pelvis, but seemed to be more fixed on the left side. A diagnosis of ovarian cyst was made and operation advised.

Operation. On opening the abdomen, the omentum was adherent over the front of the tumour. When this was separated, the sigmoid was found to be flattened out over the left lateral aspect. The cyst arose from between the layers of the left broad ligament, thus being really retroperitoneal. In the course of separating adhesions, one came to a mass of adherent intestines from which ran a diverticulum which was attached to the cyst wall. This was severed, and when the support of its connection with the cyst wall was lost, the bowel fell into such a position as to obstruct its lumen. The cyst was completely removed and weighed twenty-three and one-quarter pounds.

The condition of the bowel was investigated and it was considered safer to resect, as acute obstruction seemed inevitable. The condition is admirably shown in Figure 3. An end to end anastomosis was made. The patient made an uninterrupted recovery.

Case 4. Master F., aged fourteen years, was seen by his physician complaining of abdominal pain, on December 3rd, 1915, and admitted to Toronto General Hospital under Dr. F. N. G. Starr.

On two previous occasions he was suddenly seized with acute abdominal pain, and each time a tentative diagnosis was made of acute appendicitis, but on the physician returning in a few hours, he was surprised to find that the pain had entirely disappeared, and the patient very well.

During this attack, however, the pain persisted and on palpating the abdomen, tense coils of intestine could be felt in the middle of the lower abdomen. There was no muscular rigidity but slight nausea. In view of the history of previous attacks and their sudden cessation, a possible diagnosis of internal hernia was suggested, possibly caused by Meckel's diverticulum, despite the fact that the case clinically simulated acute appendicitis. The curious fact, however, is that during a long rough ride in an ambulance the

patient was again suddenly and almost completely relieved of his symptoms. It was considered, however, advisable to operate.

Operation. On opening the abdomen, red and distended coils of small intestine were seen, and searching for a cause, one found a hernia under a Meckel's diverticulum, precisely as shown in Case 3, except that in this case only a small loop of bowel was herniated, the rest having reduced itself spontaneously.

SUMMARY

1. In post-operative cases showing distension late in their convalescence, one should bear in mind the possibility of a Meckel's diverticulum being a causative factor, considering the fact that they occur in two per cent. of autopsies.

2. The palpation of tense coils of intestine as pointed out by Starr⁷ is an aid in localizing the obstruction.

3. The history of no previous illness and the history of no umbilical discharge is no criterion that the patient has no diverticulum remaining.

4. If a patient after operation has had an uneventful convalescence for three days, and then develops abdominal distension, acute ileus is scarcely to be considered and some other cause must then be looked for.

5. Intestinal obstruction caused by Meckel's diverticulum seems to come on more gradually and is more intermittent than most acute obstructions.

I wish to thank Dr. F. N. G. Starr for the privilege of reporting the last three cases.

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A STUDY OF 450 CASES OF WOUNDS OF THE
CHEST, WITH SPECIAL REFERENCE TO A
NEW METHOD OF TREATMENT FOR
INFECTED HÆMOTHORAX

BY WILLIAM HUTCHINSON

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THE present war, by its magnitude and the diversity of its fighting machines, has afforded surgeons numerous opportunities of advancing their science along many lines, and of solving many problems in the diagnosis and the treatment of injuries of various parts of the body.

One of the most striking instances of this is to be found in the steady advance which has taken place in the knowledge of injuries of the thorax. The work done in this region has advanced step by step until to-day we have reached a high state of efficiency.

At the beginning of the war we were interested merely in the question of diagnosis of a hæmothorax and whether or not aspiration of the blood was worth while. Fortunately it did not take very long to settle this latter point, and so aspiration very quickly became a routine procedure. Simple aspiration was very soon followed by replacing the aspirated blood with oxygen in order to do away with the disagreeable symptoms which were sometimes produced by the rapid removal of a large quantity of blood from the pleural cavity. Thus, as far as the treatment of a simple hæmothorax was concerned, perfection was reached; but there were other and more serious problems to be solved, and it was in the solving of those the most striking advance was made during the past year.

The problems with which we were confronted were three in number, how to deal with an open pneumothorax; how to deal with an infected hæmothorax; how to deal with a foreign body in the lung. During the three years of war a great deal of work has been done on these problems, and I am glad to say they have been solved.

Etiology. The wounds of the chest, which came under my care, were produced by three types of missiles, viz.:—bullets, shrapnel balls, and pieces of shell. In my series of four hundred and fifty

cases, one hundred and twenty-seven were produced by bullets, fifty by shrapnel balls, and two hundred and seventy-three by pieces of shell. These various missiles differ both in their immediate and late effect, some of them producing more serious complications than others. Wounds produced by bullets were the least serious, those produced by pieces of shell the most serious, whilst those produced by shrapnel balls took an intermediate place.

The difference in the effects produced by these three missiles may be attributed to three causes. First, the bullet, having a tremendous penetrating power, produced small entrance and exit wounds and tended to pass directly through the chest, only a few remaining in the lung. The heat of the bullet caused a certain amount of cauterization of the track and they did not, as a rule carry in with them any foreign matter.

Second. Pieces of shell, on the other hand, tended to leave the chest open, to injure intercostal vessels; to produce large lacerations of the lung; to remain in the lung and to carry in with them all kinds of foreign material.

Third. Shrapnel-balls, on account of their size and shape, tended to injure the bony framework of the chest and remain in the lung, and because of their round smooth surface only occasionally carried in with them any foreign material.

A glance at the following tables will give an idea of the penetrating powers of the different projectiles and their tendency to produce infection of the hæmothorax.

SHELL		BULLET		SHRAPNEL BALL		Total
Retained	Not retained	Retained	Not retained	Retained	Not retained	
164 36·4%	109 24·2%	18 4%	109 24·2%	22 48·%	28 6·2%	450

INFECTED

SHELL		BULLET		SHRAPNEL BALL		Total
Retained	Not retained	Retained	Not retained	Retained	Not retained	
37 45·6%	18 22·2%	4 4·9%	13 16·04%	6 7·4%	3 3·7%	81

Pathology. The pathology of wounds of the chest comprises the pathology of the various parts of the thorax. When the missile hits the chest, various effects may be produced on the chest wall. If the foreign body is very large and strikes the chest with its flat surface, the result may be simple bruising of the soft tissues with or without fracture of the ribs. If, however, the foreign body hits the chest wall edgewise, it may carry away a large portion of the soft tissue and very often portions of one or more ribs. When this occurs, the intercostal vessels are usually injured, causing a profuse hæmorrhage both into the chest and outwards through the wound. If, on the other hand, the foreign body is quite small, it will usually penetrate the chest wall, leaving a small opening which becomes immediately sealed off.

The next part affected from within outwards is the pleura, and the potential cavity lined by this membrane. When a large laceration of the soft tissues occurs with comminution of the ribs, the pleura is usually torn and the potential cavity at once becomes a definite space due to the collapse of the lung. Into this space air rushes and later on a quantity of blood collects in the cavity.

If the wound in the pleura is made by a small penetrating object, the quantity of air which enters is usually small and quickly becomes absorbed, the cavity being filled with blood. Occasionally when such a wound occurs no air enters and there are cases in which a hæmothorax does not develop. A few cases have come under my observation in which a bullet had passed directly through the chest and in which it was not possible to discover any blood in the pleural cavity. In the majority of cases the air is very quickly absorbed and by the time the patient reaches the Base Hospital, it cannot be demonstrated.

In my whole series there were only three cases of pneumo-hæmothorax other than those in which gas developed as the result of infection. Colonel Bradford saw only four cases in a series of three hundred and sixty-five wounds of the chest. Occasionally a valvular pneumothorax develops either as the result of a valvular opening having been made in the chest wall or in the lung. These two conditions must not be confused as the treatment is directly opposed. In the case of a valvular opening in the chest wall, closure of the wound will cure the condition, whereas in the case in which a valvular opening has been made in the lung, closure of the chest wound would be fatal. A case illustrating the latter condition came under my observation. Here the foreign body had entered the chest wall from behind, passed through the lung

and axilla and lodged in the upper arm. At the Casualty Clearing Station the wound in the back had been closed and the pneumothorax subsequently increased with subcutaneous emphysema of the axilla, chest wall, and arm. The patient died shortly after admission to hospital, and at autopsy a valvular opening was found in the lung. By the action of this valve, air was forced into the pleural cavity and as the wound in the chest wall had been closed, it had no means of escape.

When a pneumothorax exists there is usually found to be a negative pressure in the pleural cavity, but in one of my cases a distinct positive pressure was discovered. In this case there was a slight leak of air from the wound in the lung, as the pneumothorax recurred after every aspiration and eventually a resection of a piece of rib had to be done on account of infection. This is probably the explanation of all those cases of pneumothorax in which a positive pressure is discovered.

The blood which collects in the pleural cavity as the result of wounds of the chest is a subject of much interest. The quantity of blood which collects in the cavity depends on the amount of injury done to the lung and possibly to the portion of the lung injured. As a rule, bullet wounds through the upper part of the lung do not produce as large hæmothorax as those through the lower part. This view, however, is not universally held, but in my experience it was the case.

The source of the blood is usually the lung, but occasionally it may come from a wounded intercostal vessel. In my series only one case showed it to be definitely due to a wounded intercostal vessel.

The character of the blood varies a great deal; in some cases it is thin, bright red in colour and does not contain any apparent clot, whilst in other cases it is very thick, almost black, and contains a large amount of clot. A great deal of work has been done on this blood by Elliott and Henry, and they have come to the conclusion that the blood is defibrinated in all cases, the fibrin being deposited on the pleural surfaces. However, no satisfactory explanation has been given as to why in some cases no clot is found in the fluid, whereas in other cases such a large amount of clot is present. When the fluid blood is withdrawn, clotting does not take place in the bottle, thus showing that fibrinogen does not exist in it. On examination it will be found to contain red-blood cells, endothelial cells, lymphocytes and an occasional polymorphonuclear leucocyte.

Colonel Rudolph, however, reported one case in which clotting did occur in the test tube. This may have been due to the presence of infection which produced an outpouring of serum into the hæmothorax. In one of my cases in which infection by a non-hæmolytic streptococcus occurred clotting took place in the aspirated fluid, but the clot was not a blood but a serum clot as the result of reactionary serum poured out. This was the only case in my series in which clotting occurred in the bottle.

In a certain number of cases in which a foreign body has entered the chest, serum and not blood will be found in the pleural cavity, and in some cases the fluid is distinctly purulent. Out of four hundred and fifty cases serum was found in twenty-two and pus in five. Two of these pus cases contained bacteria.

When infection occurs in a hæmothorax the amount of fluid increases as the result of inflammatory serum being poured out. Contrary to expectation, the blood in these cases is not usually thin, but dark and thick, consequently I have come to look upon this condition as a sign of infection. At times the blood has a disagreeable odour, particularly in those cases in which the bacillus *ærogenes capsulatus* is present. On microscopic examination, the blood will be seen to contain quite a large percentage of polymorphonuclear leucocytes, the number depending on the length of time and character of the infection.

When the blood is infected with the bacillus *ærogenes capsulatus*, gas develops in the pleural cavity and the clot, of which there is usually a large quantity, has a spongy appearance.

There is always a certain amount of fibrin deposited on the pleural surfaces, and when infection takes place this fibrin is permeated with leucocytes and converted into a pyogenic membrane. Various bacteria have been found to be the cause of the infection, and a glance at the following table will show the bacteria found in my series and the frequency with which they occurred.

INFECTED CASES—81

B. <i>Ærogenes</i> Cap.....	21	=	25·9	per cent.
Streptococcus.....	26	=	32·9	"
Staphylococcus.....	3	=	3·7	"
Pneumococcus.....	12	=	19·8	"
Diplobacillus.....	1	=	1·2	"
Mixed infection.....	18	=	22·2	"

The examinations of the statistics of other surgeons show

approximately the same percentages, although some report a higher percentage of gas infection.

Lung. When a missile hits the chest without causing a wound, collapse of the lung may occur with extravasation of blood into the collapsed area and at times this area becomes adherent to the chest wall. If the foreign body fractures a rib, a laceration of the lung may be caused.

When a foreign body enters the chest, it may bruise the lung, tear it, pass directly through it or remain in its substance. In cases in which laceration of the lung is produced, collapse occurs in the vicinity of the tear, and blood is at once poured out into the track and surrounding lung tissue for a variable distance. The collapse of the lung and the clotting of the blood about the track arrest the hæmorrhage.

Very quickly inflammatory cells collect in the lung about the injury, thus completing the consolidation.

When the foreign body is retained in the lung, it is quickly surrounded by collapsed lung, blood clot and inflammatory tissue, thereby shutting it and any infective material carried in by it, off from the pleural cavity and leaving the lung to deal with any infection, which it can do admirably.

This is shown by the fact that very few cases requiring surgical interference have been met with. Colonel Rudolph, after examining a large number of cases in England, found only four with abscess of the lung. In only one of my cases did the foreign body in the lung do any serious damage.

I do not agree with the French writers who claim that in the majority of cases the hæmothorax becomes infected from the foreign body, or its track in the lung. I am quite convinced that infection is carried into the pleural cavity at the time of injury but lies dormant in the blood clot of the hæmothorax and gradually breaks through into the general hæmothorax.

I have had cases in which the bacteria were found in the clot and not in the fluid blood.

Collapse of the lung occurs in the vicinity of the injury in all cases but also at times it occurs in the lung at quite a distance from the central site of the injury and occasionally it occurs in the opposite lung.

No satisfactory explanation has been offered for this condition. Compensatory emphysema develops in the lung above the small area of compressed lung found directly above the fluid.

Pathological changes very often occur in the opposite side of

the chest, as for instance a small amount of serous fluid is often found at the base and occasionally this has gone on to empyema, which is always the result of pneumonia or an infected hæmothorax. Pneumonia occasionally develops in the lung of the opposite side and probably starts in the area of collapse. I have never seen a true lobar pneumonia but I cannot agree with Colonel Bradford when he says that pneumonic consolidation does not occur beneath a hæmothorax. In one of my cases in which the hæmothorax was infected with the pneumococcus the whole lower lobe was a mass of consolidation.

I have seen a number of cases in which the clinical signs pointed to inflammatory consolidation of a large amount of lung in the vicinity of the foreign body.

Broncho-pneumonia occasionally occurs and is usually fatal.

There is one other condition which has been met with, that is massive collapse of the lung. It comes on some time after the injury, appearing quite suddenly and produces very severe dyspnoea and cyanosis but passes off fairly quickly. It has never been known to go on to a fatal termination although it is very alarming at the time.

Pericardium. The pericardium may be injured by the missile or may become inflamed as the result of infection of the hæmothorax. A few cases of hæmopericardium have been seen and occasionally serous effusion into the pericardium has developed. Infection of the pericardium with a resulting purulent pericarditis is fortunately rather a rare occurrence considering the number of cases of infected hæmothorax. Apparently infection does not travel easily through the pericardium, as I have had cases in which a pocket of pus was found between the lung and pericardium and yet there was no infection inside this cavity. In my whole series there were only three cases of purulent pericarditis.

Great vessels. Occasionally the foreign body in entering or passing through the chest injures one of the great vessels. Two cases came under my care in which there was an aneurism of the innominate artery one of these being an arterio-venous aneurism.

Liver. The liver is sometimes injured by the foreign body as it passes through the right chest.

Bradford and Elliott have reported cases in which bile was recovered from the pleural cavity as the result of injury to the liver which communicated through the diaphragm with the pleura.

Diagnosis. The question of diagnosis of wounds of the chest really comprises the diagnosis of conditions produced in the lung

and pleural cavity by the foreign body and must be considered under the headings of "simple hæmothorax"; "largely clotted hæmothorax"; "pneumothorax"; "infected hæmothorax"; and "infected lung".

As to the diagnosis of *simple hæmothorax*, it is only necessary to mention one or two interesting points as the signs of fluid in the pleural cavity are so thoroughly well known. The level of the fluid can usually be determined by the presence of blowing breathing, cegophony and increased tactile fremitus immediately above where the signs of fluid are found. The signs found in those cases in which the hæmothorax is very large and compresses the lung down to its hilus are of interest, as they have a practical bearing on the treatment of the non-infected hæmothorax. In the first place it will be noticed that the heart is very much displaced to the opposite side and at times a pleuro-pericardial friction can be made out between the pericardium and the pleura on the uninjured side. On percussion, the whole of the injured side of the chest is found to give a flat note which at the back extends for a short distance on the opposite side of the spinal column. Tactile fremitus will be absent but the breath sounds will be blowing in character and cegophony and whispering pectoriloquy will be present.

The explanation of these signs is found in the fact that the whole lung is compressed down to its hilus and the chest, being tense, allows the bronchial sounds to be transmitted.

The next condition which is practically the same as the one already described, but has been separated from it on account of its growing importance from the standpoint of treatment, is that of a *largely clotted hæmothorax*.

In this condition, although the heart may be somewhat displaced to the opposite side, the flat area does not extend all over the injured side, but there is blowing breathing, cegophony, and whispering pectoriloquy over the whole of this flat area.

Personally, as the result of examination of a large number of cases, I am convinced that these signs point invariably to the presence of a large amount of clot in the pleural cavity. Then again if a trocar is inserted in several places and little or no blood obtained, one has additional proof that the blood is clotted.

In respect to the diagnosis of *pneumothorax*, there is nothing new to add to our previous knowledge of this condition.

We now come to the diagnosis of the most serious complication of chest wounds met with at the Base Hospital, that of an *infected hæmothorax*. The importance and seriousness of this condition is

shown by the fact that in my series of four hundred and fifty cases, eighty-one of them became infected, and of this eighty-one, fourteen died.

Bradford and Elliott found one hundred and seventeen cases in four hundred and fifty, and if the general statistics be taken, it will be found that about 25 per cent. become infected.

The diagnosis of infection in a hæmothorax must be made as early as possible if the mortality is to be kept low, and this can only be done if special attention is given to patients with chest wounds. These cases should be segregated in special wards where medical officers and nursing sisters will take particular interest in such patients. In this way the whole staff will be on the alert, and proper charts recording the temperature, pulse, and respirations, at least four times a day will be kept. I cannot emphasize too strongly the importance of proper charts as they give the earliest indication of infection, and if this be done, there is no reason why patients should show that advanced sign of infection, namely, jaundice.

Providing a diagnosis of hæmothorax has been made, as soon as the temperature, pulse, and respirations begin to rise together, an infection should be suspected and aspiration of the blood done at once. In many cases of infection the blood will be dark in colour, rather thick, and will contain tiny pieces of black clot. Sometimes the blood will have a foul odour, and when present, this is quite diagnostic of infection. As soon as the blood is withdrawn, it should be sent to the bacteriologist for examination, and a report obtained as to whether or not infection is present, and, if present, as to the special organism found. There is one point in the bacteriological examination of this aspirated blood which is of extreme importance, and that is the careful search for tiny pieces of clot, as it will often be found that they contain bacteria when none have been found in smears from the fluid.

The examination should consist not only in examining the smears but also in planting the blood on aerobic and anærobic media. If the presence of infection cannot be determined at the first examination, and the patient's condition does not improve, another aspiration must be done, and so on until either an infection has been demonstrated or the patient's condition has improved. In the majority of cases, infection will be found on the first examination and only occasionally will a second or third aspiration be necessary.

The next important condition, and one which requires much care in diagnosis, is a *wounded lung with consolidation and infection*

in its substance. These cases always have a certain amount of blood in the pleural cavity and it is not possible by physical signs alone to differentiate in the majority of cases between an infected hæmothorax with compressed lung and a hæmothorax with infected and consolidated lung. It is in these cases the greatest care is required in making a differential diagnosis as the methods of treatment in the two conditions are directly opposed to one another the former requiring active and immediate surgical interference, whereas in the latter case surgical interference would do a great deal of damage.

The differential diagnosis can usually be made by carefully considering the chart. In the case of an infected hæmothorax, the temperature, pulse, and respirations rise together, while in the case of an infected lung the temperature is usually high, the pulse rate only slightly increased and the respirations remain in the vicinity of 28 or 30. Although this is the rule, and the majority of cases come under this rule, yet as there are exceptions to all rules, an exploratory aspiration must be done and a bacteriological examination of the fluid made.

Treatment. In dealing with the treatment of wounds of the chest, they must be divided into four classes:

- 1st. A non-infected hæmo or pneumo-hæmothorax.
- 2nd. An open pneumothorax.
- 3rd. An infected hæmothorax.
- 4th. A foreign body in the lung or pleural cavity.

The treatment of a simple non-infected hæmothorax, or a pneumo-hæmothorax, consists in merely aspirating the blood from the pleural cavity. This should be carried out in all cases in which more than two fingers breadth of dulness can be made out. In my series of four hundred and fifty cases, three hundred and sixty-eight were aspirated, the remainder not having sufficient fluid to warrant it. The aspiration is done by means of the ordinary aspirating apparatus with which everyone is familiar, but there are one or two practical points which I should like to mention, as they will, if carried out, make the procedure easier both for the patient and for the surgeon. A local anæsthetic should be injected into the skin, muscles, and pleura in order to make the aspiration as painless as possible. After the injection of the anæsthetic, a tiny incision should be made through the skin so that the round canula will not be gripped by it. In the next place it is important to use a fair sized trocar, as small needles are very easily blocked, and another advantage in using a trocar is that when the sharp obturator is

removed, the blunt canula can be moved about the pleural cavity without damaging the lung. If during the aspiration the patient begins to suffer pain in the chest and shortness of breath, the trocar can be disconnected from the bottle and a little air allowed to enter the pleural cavity, and it will then be found that more blood can be withdrawn before the pain and distress return. In commencing to aspirate a chest, especially in cases where a quantity of air is present in the pleural cavity, the bottle should not be exhausted before the trocar is connected, but should be exhausted gradually during the whole aspiration as the sudden evacuation of air when the tap is opened might cause alarming symptoms.

A number of surgeons prefer oxygen replacement in these cases.

The treatment of non-infected hæmothorax in which there is a large amount of blood clot requires special mention as there is a difference of opinion as to the course to be pursued. Personally I believe the chest should be opened, all the blood and clot removed, the pleural cavity closed, and the air aspirated. I would also recommend that this be done as early as the patient's condition will permit, as then the lung will get a chance to expand before adhesions form. There are two reasons why this should be done: 1st. The removal of blood and clot by aspiration is impossible and therefore we must depend upon absorption to remove them, and as this is necessarily a slow process the lung remains compressed for a long time and adhesions between the compressed lung and the chest wall become firm. 2nd. These cases in my experience formed the great bulk of the infected ones, and I am sure that had they been treated by operation in the first place they would have escaped infection.

The treatment of an open pneumothorax has been greatly improved during the past year and the results obtained at the Casualty Clearing Hospitals are very encouraging. In this condition it is important to clean the wound thoroughly to wash out the pleural cavity with saline and to close the chest completely. This should be done early as the condition of shock will be relieved by the closure and also the danger of infection will be decreased. If the patient's condition will stand it, and the foreign body is fairly accessible, it should be removed. If there seems a likelihood of infection having taken place, then three ounces of 1-5000 flavine solution should be left in the pleural cavity and the usual after treatment of an infected hæmothorax carried out. ■

We now come to the treatment of the most serious complication of chest wounds with which we have to deal at the Base in France, *i.e.*, a hæmothorax which has become infected. While

doing surgical work in France during 1915-16, I was impressed by the great improvement in the results obtained by the cleaning out and closing of knee joints which had become infected by wounds, over the results obtained by the old method of drainage, and in reviewing the good results obtained by closing the peritoneum in cases of general peritonitis, I came to the conclusion that if the lining membrane of the knee joint and the peritoneal lining of the abdominal cavity could look after a considerable amount of infection, the pleura ought to be able to do the same. I therefore decided to apply this principle to the treatment of an infected hæmothorax, and so in the beginning of 1917 I initiated the line of treatment which I shall describe below. Before describing operative technique, I wish to say one word against palliative measures in these cases. Simple aspiration in infected cases is of no avail, as in the first place it is impossible to remove all the blood from the chest by this means and in the second place the clot in which lies the focus of infection cannot possibly be removed through a trocar. Then again it is impossible to sterilize the clot by any known antiseptic which can be used in the pleural cavity, and therefore the only possible means of treating these infected cases is by operation.

Lately Lockwood suggested that an attempt should be made to treat these cases by aspiration, basing his views on some post-operative cases which had become infected. These cases, however, differ entirely from an infected hæmothorax, as they only contain infected serum and no blood clot.

In cases of infected hæmothorax, valuable time is wasted by such attempts, but I agree with him that cases that have been cleaned out and closed should not be drained until aspiration has been given a thorough trial.

The method to be applied in these cases is as follows. As soon as the hæmothorax is found to be infected, by that I mean clinically and bacteriologically (not merely bacteriologically), the patient is taken to the operating-room and placed in a partially sitting position on the table. He is then turned a little towards the good side so that the post axillary line is brought well into view. The best anæsthetic to use in these cases is nitrous oxide and oxygen, which in the hands of a good anæsthetist* produces perfect anæsthesia. If the patient is in a very bad condition, I use a local anæsthetic up to the time of resecting the rib and then a general anæsthetic. I found that the patients came off the table in a

*The anæsthetic in all my cases was very carefully and scientifically administered by Nursing Sister Nicholson, C.A.M.C.

better condition than when they went on, and that there was no post-operative collapse, which I attribute to the use of oxygen. Chloroform and ether should never be administered to these cases, but if nitrous oxide is not available and one of these has to be used, then oxygen should be given at intervals during the operation and at the end of it. A portion of rib, long enough to allow the hand to be passed through the opening, should be removed and the blood allowed to flow out. The clot is then removed by the hand, all parts of the cavity explored and light adhesions broken down. Then by means of large pieces of gauze on dressing forceps, the remainder of blood and clot is removed. After this, the cavity should be washed out with saline and again mopped out and a running suture inserted in such a way as to include the pleura and intercostal muscles. This suture should be left quite loose so that a small quantity of some antiseptic can be poured into the pleural cavity. This antiseptic should be spread all over the walls of the cavity by means of a small piece of gauze on long dressing forceps. As soon as this has been done, the running suture is drawn tight, thus closing the pleural cavity completely. The muscles and skin are then closed and a dry dressing applied.

Forty-eight hours after the operation, the chest should be aspirated, thus removing a quantity of serum and air. This is done for two reasons, first, the serum by that time has lost its bactericidal properties and then only becomes a menace, and secondly, by removing a good deal of the air from the pleural cavity, all negative pressure is obtained which helps to re-expand the lung. It will be found that three or four aspirations are necessary during the course of convalescence.

The antiseptics which I have used in these cases include eusol solution $\frac{1}{2}$, a suspension of B.I.P. in liquid paraffin in the following proportions, B.I.P. $\frac{1}{2}$ oz., liquid paraffin 6 oz., flavine solution 1-5000 and normal saline, the amount left in the chest being 3 oz. The results from twenty-nine cases treated in this manner, are as follows:—

EUSOL		B. I. P.		FLAVINE		SALINE	
Remained closed	Re-opened	Remained closed	Re-opened	Remained closed	Re-opened	Remained closed	Re-opened
2	5	11	4	2	3	1	1

Total—Remained closed, 16; reopened, 13.

When considering this method of treatment, the question naturally arises as to which cases should be treated in this way. In answer to this I may say that at the present time I am inclined to close every case, and if the patient shows signs of becoming worse after the first post-operative aspiration then it will be time enough to drain.

There are, however, certain types of infection which lend themselves to this form of treatment better than others, as an examination of the following table will show:—

	Remained closed	Reopened
B. Aerog. Cap.....	11	3
Streptococcus.....	1	6
Staphylococcus.....	1	0
Pneumococcus.....	1	2
Diplobacillus.....	1	0
Mixed Infection.....	1	2

There is one point in the technique of the treatment by drainage which I wish to point out and that is that the constant washing of the pleural cavity in early cases is harmful. In place of this washing process the occasional filling of the cavity with a eusol solution 1-3 and good grainage should be substituted. In this way the body is stimulated to pour out serum into the cavity which washes the pyogenic membrane from within outwards instead of merely washing its outer surface. In order to do this, the patient is placed on his good side, so that the opening of the chest wall will be the highest point. A one-third solution of eusol is then allowed to flow gently into the cavity until it is filled, and then the patient is turned over and the fluid allowed to run out. This is repeated every second or third day, depending on the condition of the patient.

The last question with which we have to deal is that of the treatment of the foreign body which has been retained in the lung. It is over this question that a great deal of controversy has taken place during the past three years. I have had the opportunity of treating a large number of cases and have talked to a number of surgeons and physicians, and as the result of my own experience and that of others, I have come to the conclusion that the question must be decided separately in three types of hospitals: the Casualty

Clearing hospital, the Base hospital in France and the Base hospital in England; and that a surgeon in one area is not in a position to dictate to a surgeon in any other area. The French surgeons, generally, advocate the removal of all foreign bodies from the lung, large ones at the Casualty Clearing Stations and smaller ones later. The English surgeons are much more conservative and only advocate the removal of large foreign bodies at the Casualty Clearing Hospitals. As all my work has been done in a base hospital in France, I am only in a position to discuss the treatment which should be carried out in cases with retained foreign bodies in the lung during the interval from the time they leave the Casualty Clearing Hospital to the time they arrive in England.

As a result of an experience with four hundred and fifty cases, and from reports received from other surgeons similarly situated, I am convinced that no attempt should be made to remove the foreign body from the lung while the patient is in a Base Hospital in France.

Colonel Rudolph investigated a number of cases of this nature in England and only found four in which the foreign body gave serious trouble. Colonel Elliott investigated one hundred and seventy cases in England and found only one fatal case, which case had had an operation for the removal of the foreign body.

RESULTS

In my series of four hundred and fifty cases, there were twenty-seven deaths, the causes of which when examined, will show the hopelessness of certain cases and will also point to one problem in surgery which has not been solved, that is, cases in which the infected hæmothorax is pocketed. In these twenty-seven cases the causes of death were as follows:—

1. Septicæmia, due to pocketing.....drained.
2. Septicæmiadrained.
3. Septicæmia.....drained.
4. Abscess of Lung.....drained
5. Pneumonia and empyema (opposite side)
 hæmothoraxdrained.
6. Gangrene of lung.....drained.
7. Septicæmia.....drained.
8. Septicæmia.....drained.
9. Moribund, time of operationdrained.
10. Septicæmia, due to pocketing.....closed and reopened.

11. Septicæmia, due to pocketing closed and reopened.
12. Septicæmia, due to pocketing closed and reopened.
13. Pyæmic abscesses (both lungs) closed and reopened.
14. Pneumonia and empyema (opposite side),
 hæmothorax closed and reopened.
15. Acute gas gangrene of chest wall closed and reopened.
16. Septicæmia closed and reopened.
17. Septicæmia closed and reopened.
18. Gas gangrene of chest wall closed and reopened.
19. Double pneumonia no operation.
20. Broncho-pneumonia and tuberculosis no operation.
21. Septicæmia no operation.
22. Gas gangrene (one side), pneumonia and
 empyema (opposite side) no operation.
23. Streptococcus (arm) mediastinitis, abscess
 of lung no operation.
24. Pneumonia (opposite side) no operation.
25. Double broncho-pneumonia no operation.
26. Secondary pulmonary hæmorrhage, in-
 fected hæmothorax drained.
27. Died on table before operation.

CONCLUSIONS

1. All cases of wounds of the chest should be treated in special wards or special hospitals.
2. Careful charts should be kept which record temperature, pulse, and respirations four times a day.
3. Early diagnosis of infection is important.
4. Every case in which there is more than two fingers' breadth of dulness should be aspirated.
5. Cases of open pneumothorax should be closed as early as possible.
6. Cases in which there is a large amount of clot in the chest should be opened, blood and clot evacuated and the chest closed. This should be done as early as possible.
7. Cases in which the hæmothorax is found to be infected should be opened, washed out and closed; some antiseptic being left in, preferably an emulsion of B.I.P. in liquid paraffin.
8. Post-operative aspirations must be done in all closed cases, the first forty-eight hours after operation.
9. No attempt should be made at the Base Hospital in France to remove a foreign body from the lung.

MOUTH INFECTION AS A SOURCE OF SYSTEMIC DISEASE

B. A. MURRAY, D.D.S.

HISTORICAL.—More than twenty-five years ago, it was pointed out by W. D. Miller that oral sepsis was the prime factor in the causation of certain constitutional disturbances.

In 1900, Dr. William Hunter, of London, England, published an article in the London *Lancet*, in which he suggested that it could not be a mere coincidence that certain constitutional conditions occurred in patients with septic mouths. In 1901, he further elaborates on this subject, but not until 1911 was he able to thoroughly awaken the medical and dental professions to a realization of their responsibilities to the public in reference to septic mouths. His attack on the American dentists was vehement, but had the desired effect, although for a time it created no little antagonism, due to the fact that he failed to differentiate between the scientific dentist and the charlatan. Then, too, Dr. Hunter was pleased to take unto himself the responsibility of determining what teeth should be sacrificed, and what ones should be retained, as well as to suggest the class of artificial substitutes.

To quote Dr. Hunter: "For the past twelve years, in connection with various studies, my attention has been called to an increasing degree, to an important prevalent source of disease, one whose importance I think is not sufficiently recognized. The source is oral sepsis—sepsis arising in connection with diseases of the mouth. My attention," he says, "was first drawn to it in connection with the pathology of anæmia, and since then has been extended in connection with the pathology of a great number of infective diseases, which have one factor in common, viz.: septic organisms underlying them."

To-day, no less than twenty odd diseases can be traced to these same septic organisms, and the physician who is not cognizant of the influence of these micro-organisms, as manifested by their effect on the system, is considered a back number. On the other hand, the physician who is wide awake to the discovery and the elimination of these septic foci wherever found, is a benefactor to

the people whom he serves, as well as being likely to be in a position to serve the greatest number.

The time has come when a patient presents himself to a physician, with one or more of the many diseases such as anæmia, arthritis, rheumatism, endocarditis, gastro-enteritis, nephritis, diabetes, etc., or even certain eye and ear conditions. The physician, knowing his limitations, calls in to consultation, the stomatologist, the rhinologist, the gynæcologist, and the genito-urinary specialist. Together they make a thorough search for primary septic foci, the discovery and removal of which will in all probability aid materially in clearing up the pathological lesions as manifested in the individual case.

It is generally conceded, that within the alimentary and respiratory tracts are found a large percentage of the primary septic foci, from which by means of the circulating blood, these micro-organisms are carried to all parts of the body. Billings makes the claim that systemic disease due to a focus of infection anywhere, is probably always hæmotogenous, and histologically there is found embolism of the small and terminal blood vessels. Local hæmorrhage and endarterial proliferation result in interstitial overgrowth, cartilaginous, osseous, vegetative, and other morbid anatomical changes depending upon the character of the tissues infected. In other words, a chronic abscess tooth may cause systemic disease, by hæmatogenous bacterial emboli, which infect and at the same time deprive tissues of nourishment.

It was formerly thought that the staphylococcus was the bacterium accountable for these diseases, but more recent study has proven, that the blame lies chiefly with the streptococcus pneumococcus group, more particularly the streptococcus viridans. It is worthy of note that this particular bacterium is always found in connection with pyorrhea alveolaris and chronic alveolar abscess.

Drs. Rosenow, Billings and Gilmer, of Chicago, have since made exhaustive study of the conditions as found in the oral cavity, some of which are worthy of being brought to your attention.

Dr. Rosenow says: "One striking thing in connection with some of the most chronic infections, is that the character of the bacteria found in the lesion may be quite different from the character of those found in the focus of infection at the same time. This, however, does not minimize the importance of the focus of infection in any way, for the organism found in the tissues may have undergone a change. This change seems to be due to the effect of the varying degrees of oxygen tension on the members of the streptococcus group."

It has been my purpose to briefly draw a mental picture of the possibilities of primary septic foci as found in any location of the body, from possibly the cutaneous surface of the great toe, or possibly from the urethra of the male, as manifested by some low form of inflammation, or possibly from a chronically affected tonsil, but more than likely from one or more of the fifty-two roots of the teeth, for it would seem to me, that in the ratio of the number of roots of the teeth, is the ratio of the possibilities of the septic foci. For certainly no part of the anatomy presents greater difficulties for the exercise of prophylaxis than does the oral cavity. With your permission, I shall endeavour to briefly outline the conditions as found in a large percentage of the mouths of the patients sent to the dental surgeon by his medical friends, with a view to the discovery and treatment of all oral septic infections, hoping thereby to be of aid in the fight against the ravages of some particular disease or diseases. A superficial examination is usually all that is necessary to prove the necessity for a thorough "house-cleaning" in order to make a more careful examination possible. This superficial sterilization being completed, the mouth is now ready for a more careful examination to determine what teeth and roots should best be extracted, as well as the best manner for treating remaining teeth.

Extraction of these septic teeth should be the last resort, for the teeth are valuable organs, and should not be ruthlessly sacrificed; yet the health and life of the individual are worth more than many teeth. When the value of a tooth is weighed against the health of the individual, there is no question about which shall be sacrificed. Your essayist knows of no circumstances under which the exercise of good judgement and wise conservatism are of greater value to the patient than in cases of this character. If, in the judgement of the operator, it is best to retain certain devitalized teeth, the roots of each should be carefully radiographed with a view to discovering blind abscesses or other focal infections. Next, with a properly shaped explorer, search should be made for pyorrheal pockets, areas of carious or necrosed bone, together with all forms of inflammation as found about gingival margins, about ill-constructed crowns, bridges, and plates, together with all other pathological lesions within a given month. At this point a word of caution might not be amiss, this caution to be exercised in all mouths under observation, and that is for the stomatologist to be on the eternal alert for evidence of syphilis, for oral manifestations of this disease are much more common than is generally thought by the average dental surgeon.

A complete history is thereby obtained and report is made to the physician sending the case, and from that time on it is only necessary for careful co-operation of physician, dental surgeon, and patient, until a satisfactory recovery is made; whereas, without this team-work, recognition of and successful treatment would be well-nigh impossible.

The following three cases from my own practice are illustrative of the opportunities which the stomatologist may have for assisting the internist:

Case 1. Mrs. A. J. S., age forty-five, came to my office accompanied by her physician and nurse, suffering from pernicious anæmia, had been confined to her bed for much of the time covering a period of months. An examination of her mouth disclosed the fact that a number of her teeth were fairly floating in pus, others showed evidence of alveolar abscess at apices of roots. Five of the worst of these teeth were extracted, the remainder treated for pyorrhea or abscess until all evidence of pus had cleared up, and teeth became tight in their sockets; this took upward of two months' time. The patient showed evidence of improvement within a month of the extraction of the first teeth, and within six months was doing the most of her house-work, having dismissed both nurse and maid. After two years, no evidence of relapse.

Case 2. Mrs. E. P., aged forty, suffering from arthritis, more particularly of the joints of the fingers; it was with difficulty that she could open and close her hands. An examination of the mouth disclosed the fact that all of her teeth were affected with pyorrhea; in addition, two or three had chronic alveolar abscesses without fistulous openings. Surgical amputation of individual affected roots of multi-rooted teeth and surgical treatment of pyorrheal teeth effected a cure. Within three months all evidence of arthritis had disappeared. Four years have elapsed without any return.

Case 3. Mr. B. presented with a case of antral engorgement, effected by abscess about the mesio-buccal root of upper left second molar. Case readily responded to treatment, clearing up a bad case of rheumatism.

SUMMARY

The primary pus focus is the predominating etiologic factor in the production of a large number of diseases.

Systemic diseases due to a focus of infection anywhere are probably always hæmatogenous.

Partial or complete ischæmia of the tissues due to embolism is an important factor in the production of the morbid anatomic changes.

Early recognition of focal infection associated with septic teeth will often prevent the establishment of many serious local and general disorders.

The mouth is likely to be the greatest nidus for the growth and development of micro-organisms.

To a considerable degree the elimination of these oral pus foci can be brought about without wholesale extraction on the part of the dentist of the future, and surgical amputation of roots of the teeth will be the means used in performing cure rather than its attempt by the use of antiseptics.

It is not within the province of the physician and surgeon to indicate the teeth to be extracted or otherwise treated; the intelligent dentist can best determine the possibility of saving individual teeth as well as complete removal of septic foci within the mouth. Neither is it within the province of the dentist to attempt the diagnosis of any general disease by claiming its cause to be oral pus foci.

Team work is a necessity in seeking out and eliminating pus foci.

PRESIDENTIAL ADDRESS ON "PREVENTIVE
MEDICINE" READ AT THE ANNUAL
MEETING OF THE NEW BRUNSWICK
MEDICAL SOCIETY
HELD IN SAINT JOHN,
IN JULY, 1918

By F. H. WETMORE, M.D.

Hampton, N.B.

I SHALL first refer to sundry matters of general interest, such as have usually been mentioned by the gentlemen who have preceded me in this office; and then it is my purpose, as indeed it is my duty, to bring before you some of the more important phases of the subject of preventive medicine, especially from the point of view of the more recent advances in medical science, keeping in mind the needs of the hour, and of this province in particular.

Before beginning, let me express to you my heart-felt thanks for the great honour conferred upon me by you, my medical confrères, in electing me to the high and responsible position of President of the New Brunswick Medical Society.

This Society was organized at Fredericton on July 19th, 1881, just thirty-seven years ago. Of the thirty-seven members then present, the following are still living, namely: Drs. Atherton, James Christie, G. M. Duncan, Sprague, Inches, D. R. Moore, and Burnett. In 1882, Drs. Thomas Walker, J. W. Daniel, and J. N. Smith had joined. To these, and to those who have passed away, the profession owes much, such as the inauguration of the New Brunswick Medical Act and Amendments thereto, and the formation of the Medical Council.

It is fitting that I should refer to the death of one who was present when our society was organized, who was a member of the first medical council, and a regular attendant at the meetings of the society for many years. I allude to the late Dr. Boyle Travers, a resident of this city, who died in April of the present year, old and full of honour, at the advanced age of ninety-four. To day we feel the loss of another member of our society who passed away while yet

in the prime of life, just after our last annual meeting. I refer to the late Dr. T. Dyson Walker of this city. At home or abroad, he was ever endeavouring to improve himself in his profession, that he might make himself more useful to his patients. He was a faithful member of the staff of the public hospital here for many years, and had obtained more than provincial eminence as a surgeon. For many years connected with the 8th Field Ambulance, he rose to the rank of Lieutenant-Colonel, and, although in poor health, tried to the last to do his bit for his country at Aldershot. He was a particularly active member of both the local medical and of this provincial society. He was ever thoughtful of others, his sympathetic nature showing itself in his doings rather than by words. At our meetings he was usually to be found trying to make it pleasant, socially and otherwise, for our visitors.

The following members of our society, in common with medical men and women from other parts of the civilized world, responded to the call of duty, left their practices to risk their health and their lives, in the service of their country and are still overseas, namely:

Colonel Murray MacLaren, Lieutenant-Colonel G. G. Corbett, Major S. S. Skinner, St. John; Major Laughlin, Milltown; Major Murray, Sussex; Captains T. H. Lunney, D. C. Malcolm, J. A. McCarthy, E. J. Ryan, H. L. Walker, W. Warwick, St. John; Captain Dyas, St. Stephen; Captain Lawson, St. Andrews; Dr. Margaret Parks, St. John.

The following members were overseas and have recently returned and we cordially welcome them to our meetings: Captains S. S. King, Hampton; E. A. Thomas, C. M. Pratt, St. John; W. Ruddick, Sussex; E. V. Sullivan, St. Stephen; Disbrow, Dalhousie; Losier, Chatham; A. E. Gardiner, McAdam Junction; Dr. L. deC. McIntosh, Hartland.

The medical men whose names have been mentioned as having gone overseas, as well as those who have not yet been across the Atlantic, are doing their bit in this world-wide struggle in which civilization is at stake. And the great mass of the people, at home or abroad, are giving their lives, their wealth or their labour for their country. The duty of medical men remaining at home is to endeavour to improve the conditions of the country for the benefit of our returned soldiers and their families, and to save the lives and conserve the health of the rising generations. This can best be done, not only by curing disease, but principally by doing away altogether with its causes.

Bacteriology, the study and practical application of the teach-

ings of which about half a century ago, rendered the name of Pasteur immortal and through Sir Joseph Lister made possible the present wonderful success of operative surgery, is the reconstructing force in the newer methods of dealing with public health. For the best scientific application of our knowledge to the treatment of many surgical and medical diseased conditions, the bacteriologist and pathologist is an essential. Wherever a serious and up-to-date effort is being made to prevent and cure germ infection, there you will find the bacteriologist. He is in the army, and in the navy, whether they be in active service or otherwise.

The epoch-making success in the treatment of infected wounds, on the germ-laden soil of France and Flanders, was rendered possible by his investigations. The removal by the surgeon of the first germ-sodden layer of the soft tissues in the wound area, followed by immediate suture and the use of antiseptics to prevent further infection, have given such success in saving life and preventing disabilities as to make us proud of being members of the medical profession. And it is worth while in passing to mention the names of these antiseptics that in their usefulness even in civil life are likely to supersede the old and tried carbolic and mercurial preparations. That gas which, contrary to all the customs and usages of warring nations, nearly won for the enemy the coveted prize of the Channel ports, and gave the opportunity for our soldier representatives to win undying fame for the name Canada at the second battle of Ypres, is the same gas, chlorine, which is now used to purify water and to disinfect wounds. First Dakin's solution was used and later Dakin's chloramines. Chloramine-T called "Chlorazene" in watery solution, is likely to remain with us. Dichloramine-T, in which the chlorine is in a still more stable form, dissolved in chlorinated oil, is, one would think, likely to become generally useful for industrial surgery, especially in hospitals. The wounds do well, the dressings are painless, because the oil prevents the gauze from sticking, and time and expense are saved. There is a wonderful saving in dressings alone and in the time and trouble required to sterilize the same. But this is a digression from my subject.

From the fact of the passing of a new and up-to-date public health act by our legislative authorities, which, I am told, is about to be put in force, we trust and believe that a new era in the prevention of disease is about to be inaugurated in the Province of New Brunswick. If such be the case, then the one thing, more than any other, that makes us believe that it will be successful, is the

fact that there has been appointed for the province by the legislature, a highly trained and competent bacteriologist, Dr. H. L. Abramson, formerly assistant to Dr. Parks, of New York. Credit for this appointment should be given to the medical gentleman who represents the city of St. John in our provincial legislature, the Hon. William F. Roberts, Minister of Health, who for ten long years struggled to bring it about. And let me here say that I consider it the duty of medical men throughout the province to give the honourable gentleman every assistance in the new and difficult task before him. Along with the privileges granted to the profession under the medical act, is their responsibility to the State in reporting gratuitously, for the purpose of perfecting our vital statistics, both births and deaths, and cases of contagious disease.

The old idea concerning the prevention of disease was to improve the general health of the body and to attend to cleanliness, both personal and of our surroundings. The prevention and control of disease in the militia has taught us, however, or at any rate, has forcibly impressed upon our minds, the fact that this is not sufficient; but that the individual must be protected when possible by special means against each separate disease. We do the latter by rendering him immune by vaccination against smallpox, and typhoid and paratyphoid fever. And the cleanliness that is required is not general cleanliness, but the specific cleanliness that will keep him from taking into his system the germs that come from an infected human being or animal. The old idea sought the germs in man's surroundings, the new finds them in man himself.

The germs present in an infected individual leave the body by the main orifices of the body, the nose and throat, the bladder and the bowels in the discharges. A well individual becomes infected by taking these germs in through the mouth or nose (venereal disease is an exception to this rule). Tuberculosis, typhoid fever, diphtheria, cerebro-spinal meningitis—whatever the disease, the specific germ which is the cause does not develop outside the body, except rarely and temporarily in milk or water, and when carried by flies. These discharges get from the sick to the well by means of the mouth spray getting on the food (as in tuberculosis) or by the hands containing the germs in the discharges from the bladder or bowel (as in typhoid fever). In this way, as well as by the mouth spray, food is infected. The inanimate bodies—the *things*—thus smeared with the discharges are dangerous, that is, infectious, only when the discharge is still fresh and moist. The *bacillus typhosus*, for instance, will die in two weeks' time in water. For

the germs of all the infectious diseases are incubator plants or animals, and cannot live for any length of time outside their host, the human body.

And the known cases are only half the danger. In typhoid fever, for instance, missed cases (the mild, early, convalescing, unrecognized and concealed cases) and typhoid carriers must be sought for and supervised. The carrier is a person who, while in good health himself, has the germs in his system, and gives them off in the discharges from the bowel or bladder. If he is employed in the preparation or care of food, he is probably the cause of an outbreak of typhoid fever, while the early cases before the disease is recognized, the convalescent cases that are not isolated for a sufficient length of time, and the mild unrecognized cases, are the cause of the continuance of the outbreak.

And what has been said of typhoid fever applies to other infectious diseases. In diphtheria the contact case that is the cause of the outbreak, is the mild unrecognized case, or the convalescent case still giving off the specific germs in the mouth and nose discharges. And it is the same with the scarlet fever *contact* case. Here, too, contrary to our past belief, it is the discharges from the throat, and not the peeling skin, that contains the specific *materies morbi*. And so with measles, german measles, mumps, whooping cough, smallpox, chicken-pox and, of course, tuberculosis (human), venereal diseases, trachoma, cerebro-spinal meningitis and leprosy. In all these the *contacts* are the "wolves in sheep's clothing," as Prof. H. W. Hill puts it, that require to be hunted down. Eliminate contact cases and you eliminate other forms of infection also.

It is the physician's privilege to treat the diseased individual. Prevention is a governmental function. In order to find these contact cases, to prevent their discharges from getting into our food and water supplies, and to avoid the contact of the uninfected with the infected, a modern, up-to-date Public Health Department requires experts, the vital statistician, the epidemiologist, the laboratory man, and the sanitary engineer.

On account of the great number of cases, their abiding presence, and their vital importance to the welfare of the race, now and in the future, I shall speak more particularly of two infections, namely: tuberculosis and venereal diseases.

Tuberculosis kills five times as many people as all the diseases usually "disinfected" put together. While diphtheria germs flourish only in the nose and throat, and typhoid germs in the intestines only (possibly in the blood), the germs of tuberculosis flourish al-

most anywhere in the body, in the glands, bones, joints, intestines, kidney, brain, and lungs. The germs of all three diseases gain entrance to the body by the mouth, chiefly through the *hands*, also through food and milk, and in typhoid fever by water and flies. Only the germs of diphtheria that lodge in the throat cause disease, only the germs of typhoid that lodge in the intestines cause disease.

The germs of tuberculosis go into the intestines, and then into the blood, settle in that as in a river, and lodge some in the lungs, some in the joints, and others in the bones, glands, or kidney. We do not breathe germs into the lungs. In tuberculosis of the kidneys the germs escape from the body by way of the bladder, and in intestinal tuberculosis in the bowel discharges, but the main source of infection is the lungs. From a highly infectious case, twenty-four billion germs may escape daily, although from an ordinarily infectious case only four or five billion are given off. As mentioned before, these are carried by the mouth spray, and on the hands. The form of tuberculosis that children get from drinking the raw non-pasteurized milk of tubercular cows, affects chiefly glands and bones, does not cause disease of the lungs and therefore cannot be communicated from one human being to another. It is only in the bodies of their victims that these germs find the peculiar food, high temperature, abundant moisture and darkness which is essential for their continued development. A visual census of infectious germs then would find them only in humans (or animals) and in their immediate neighbourhood. The open cases of tuberculosis are the cases carrying active, living, growing germs in the lungs, germs escaping to the outside and reaching other persons' mouths. In our climate *one* person in every five hundred of the population is an open case. That would mean over one hundred for this city and about seven hundred for the province.

The common-sense method of abolishing tubercle bacilli from off the earth would be first to hunt for the open cases and prevent them from infecting others by the mouth spray and the hands. To quote Prof. H. W. Hill, many of whose ideas I have made use of in this address, "Hunt with ingenious, skilful, diligent, sagacious, well-trained hunters, epidemiologists as devoted and persistent in their work as the average insurance agent is in his, men who devote themselves to the abolition of tuberculosis as wholeheartedly as any merchant does to making money." Begin with the known cases, and search the zones of infection surrounding each for the mild, unrecognized and concealed cases. Place the open cases where they can spread disease no further. Thus you stop further infec-

tion. To do other work and not do this is but scouting. Keeping in mind the idea of the visual census, let us train our guns (the expert diagnosticians paid by the State) on the main masses of the enemy (the bacilli in and around the "open" cases); let us destroy what we can (by disinfection), and carry off the remainder to our detention camps (our county hospitals). In this city there is a hospital for advanced cases of tuberculosis capable of accommodating sixty-three cases, little more than half what the city requires. For the rest of the province with over six hundred open advanced cases, as far as I am aware, there is no accommodation. It is true that there is a sanatorium at River Glade, but that is for the early, curable cases, and rightly refuses to take those of an advanced type.

The early cases should be advised to go to a sanatorium or, failing this, they should be supervised at home. The River Glade Sanatorium is an educational institution, teaching the tuberculous how to live. And each discharged patient is a centre for the spread of the knowledge of correct living. The institution has had its influence on the doctors of the province as well, giving them an opportunity to learn the view-point of the disease, and acquainting themselves with better methods of early diagnosis (this more especially at the tuberculosis clinics). And this is no easy matter, for the tuberculosis specialist is a highly trained individual. To learn the view-point one must take advantage of every opportunity, for it is "precept upon precept, precept upon precept, line upon line, line upon line, here a little and there a little".

We are only now beginning to realize what a great work has been accomplished in the campaign against tuberculosis in this province, by this institution and the clinics carried on in connection with the same. Dr. Townsend, who recently resigned the position of superintendent, to enter a wider field in patriotic work in his native country to the south of us, was an able expert who had received exceptional training in his specialty on both sides of the Atlantic. The members of the profession are indebted to him for many favours, and he will be greatly missed.

The profession is also indebted to the medical superintendent of the St. John County Hospital for his untiring efforts in teaching them somewhat of his specialty.

I would offer the suggestion that the department of health, as soon as possible, use all its influence towards providing means of segregation of advanced and highly dangerous cases of tuberculosis throughout the different parts of the province.

Also that tuberculosis clinics be established in other localities in the province than where they have up to now been carried on. Possibly the plan said to be carried out in Nova Scotia might be adopted, namely: that physicians in certain centres of the province, more or less expert in the diagnosis of tuberculosis, might be paid by the State to do government work of this kind.

Perhaps because the returned soldier problem is drawing more attention to the question among civilians, venereal disease is rivalling in importance tuberculosis. The report of the Commission of Conservation on "The Prevalence of Venereal Diseases in Canada", published in pamphlet form in 1917, shows the importance of the subject. At the Toronto General Hospital from 12 to 14 per cent. of the patients admitted to the public wards were found to be infected with syphilis, inherited or acquired, and 66 per cent. of them were not aware of the fact. The report of the New York City Department of Health, 1914, states that of the six million of people in New York City, 25 per cent. have venereal disease of some kind.

The public should be taught that the disease is highly infectious at certain stages, and that in early adult life chronic affections of the blood vessels and nervous system are usually caused by this infection, such as aneurism of the aorta, angina, a paralytic stroke between forty and fifty years of age, locomotor ataxia, and general paralysis of the insane. The public should be taught that the disease is transmitted from the parent to the child before birth, and is frequently the cause of successive miscarriages and stillbirths. Or the offspring may live and be defective physically mentally, and morally. Thus may the "sin of the fathers be visited upon the children, even unto the third generation". And this is but a glimpse of the subject. It has been said that 50 per cent. of all cases of sterility in the female, and 40 per cent. of all cases of congenital blindness are due to infection by the other form of venereal disease, gonorrhœa.

A more enlightened view of venereal disease by the general public will force our legislative authorities, Dominion, Provincial, and Municipal to expend more money for its control.

Dominion authorities who make and control the immigration laws, and who control the militia, should see that infected soldiers are cured before they are allowed to return to their families.

TERMINAL DISINFECTION

BY W. H. HATTIE, M.D.

Provincial Health Officer, Nova Scotia

THE days of real heroism have not yet passed. Men not only face as unflinchingly as of yore the death dealing mechanisms of war, but they still dare to attack the entrenchments of custom, of prejudice, and even of affection. There is no sphere of human activity which lacks its champions of reform or at least of change. Few of us can abide monotony. For most of us there is much charm in adventure, and for many of us there is no diversion more tempting than a tilt at some time-honoured and widely advocated practice, especially if it be supported by the firm and unquestioning faith of a dominating cult.

For generations the fumigant of the big smell has had an established grip upon the affection and the imagination of the people. It has been revered as the great deliverer from plague and pestilence. It has been the comfort and support of those who have made sacrifice to the insatiate maw of infection, whose dread of further tribute would otherwise be overwhelming. It has been the *raison d'être* for a multitude of sanitary inspectors and various otherwise dubbed officials, who, save for it, might never have ornamented our public health organizations. In short, it has in various ways influenced the fabric of human achievement. And yet, of recent years, there has arisen and flourished a sect which disputes the efficacy of fumigation, which likens its practice to the loathsome rites of witchcraft and kindred mummary, and which demands its abolition as an expensive, mischievous, and pernicious deception, to which no honest and intelligent man should give countenance.

A tribute to heroism is never amiss, and one may be permitted to express his admiration of the valorous temerity of those who initiated and support this heterodoxy, who shrink not from assaulting the strongholds of the hierarchy of fumigators, and who, when reviled, revile again. But I wish to merit a certain reputation for

courage myself, and so, thus demonstrating that there is no ambiguity about my position, I unhesitatingly array myself on the fence in the most uncomfortable attitude of strict neutrality—an attitude which not only demands ceaseless vigilance if one is to correctly determine the side upon which ultimate safety lies, but which subjects one to constant imminent danger from the shafts and arrows of both the combatant forces.

I take it that you have already been made aware of the arguments *pro* and *con* terminal fumigation. The arguments against a practice which has endured for so many years, which has given empiric grounds for its continuance, and which has gained such universal adhesion, must be convincing indeed if they are to shake one's faith in its value. Some of these arguments are in reality not easily set aside. There will be few, for instance, who will argue the statement that infective bacteria are most virulent when they first make their escape from the body, and lose in virulence upon exposure to light, air, unfavourable temperatures, etc. No one will claim that fumigation has always been carried out in the thorough manner demanded by the books, or that secondary cases have not been escaped in spite of insufficient fumigation. Nor will one brush aside as immaterial, even if they be regarded as unconvincing, the experiences reported from certain communities in which terminal disinfection has been abandoned. But, on the other hand, one thing which experimentation has made plain is that the resisting powers of bacteria are not less variable than the resisting powers of human beings, and while it is doubtless true that most infective organisms lose pathogenicity shortly after they leave the animal body, it by no means follows that it is the invariable rule. It is quite possible that escape from secondary cases in undoubted instances of incomplete terminal disinfection has been due to nature's beneficent favour rather than to man's clumsy effort at germicide. But in the face of so much experimental evidence that gaseous fumigation kills bacteria, it is rather a broad claim to make that it is useless. Even if imperfectly practised, it is not inconceivable that the addition of the fumigant to the other inconveniences against which the germs have to contend might prove to be the final factor in effecting their destruction.

We have but one laboratory in Nova Scotia in connexion with our public health service. To this, swabs from suspicious throats come from the most remote parts of the province. This means that the germs contained on these swabs are subjected to conditions scarcely favourable to their persistence for periods of frequently

forty-eight to sixty hours. Yet positive cultures are often obtained from such swabs. Does this not place some doubt upon the assumption that disease germs lose virulence very rapidly upon their escape from the body, and lend support to the contention we still hear from various sources that infection may be carried in fomites for considerable periods of time?

There can be no doubt of the need for stressing the supreme importance of what is termed concurrent disinfection—a term, by the way, which should be authoritatively defined if it is to be thoroughly understood. In communities where the public health service is well organized and liberally financed, it may be possible to carry out concurrent disinfection in so complete a fashion that terminal disinfection may be superfluous. But such communities, up to the present, constitute a very small minority. Practically everywhere, infectious conditions must still be treated under circumstances which render terminal cleansing imperative, and such terminal cleansing can rarely, except in cities and considerable sized towns, be assigned to trained and competent persons. Seemingly, therefore, there will be many opportunities for fumigants to supplement the efforts of the little-experienced nurse and the quite inexperienced scrub-woman. If fumigants are valueless as germicides, their employment would of course be futile, but I do not think that anyone has taken such extreme ground as to deny them germicidal power.

Most of the evidence we have of the disinfecting properties of the gases ordinarily used in preventive medicine has been furnished by laboratory workers who have used cultures of various bacteria in their experiments. We are perhaps too prone to assume that bacteria grown *in vitro* have the same characteristics as those grown in the animal body. The artificial conditions under which bacteria are cultured in the laboratory must demand of them the development of some of the powers of resistance of which we suspect them to be capable. Consequently it is not impossible that the experiments which have afforded us the bulk of our knowledge concerning the disinfectant gases have been carried on with bacteria which have already become somewhat accustomed to adversity and are therefore more resistant than germs but recently liberated from the congenial soil of the animal tissues. One feels, therefore that it is quite likely that germs which have not accrued such possible increased resistance, but which have on the contrary been already somewhat weakened by lack of nourishment and exposure

to light, air and dessication in the sick room, may perish more rapidly than the laboratory breed when exposed to the action of fumigants.

A point which is not infrequently urged by opponents of gaseous fumigation is that gases have limited powers of penetration. This must be admitted, but the statement is equally true of bacteria. If, then, we do not deliberately enfold bacteria in articles to be fumigated, they are unlikely to find lodgement where the gas cannot reach them.

It cannot be doubted that fumigation is quite too often undertaken by those who do not appreciate the need for taking into account the various factors necessary to secure satisfactory results. To this may be attributed, in large measure, the doubt in the efficacy of fumigation which is becoming so widespread. It is, however, unfair to condemn a measure which is insufficiently tested. Rather should we insist upon the necessity of meticulous attention to all details, such as complete closure of the apartment, proper temperature, proper humidity, quantity of gas generated, and time of exposure, in order that the fumigant may be given a real opportunity to effect its purpose. The mere statement that fumigation as ordinarily practised is useless can scarcely be considered as an argument in favour of its disuse.

There are several things of which I am quite convinced. Much of the fumigation which is being done is worthless, and represents a needless waste of money and material; much of it engenders a sense of security which is unjustified and is responsible for consequent spread of infection; some of it is unnecessary, because of the thoroughness with which "concurrent" disinfection is being attended to. My position in the matter of fumigation is stated in the following excerpt from our Nova Scotia Rules for Quarantine and Disinfection: "*Fumigation is useless unless carried out with the most precise attention to every detail.* In several places it has been abandoned, but where there is any doubt about the care given to the immediate destruction of infectious discharges, and unless the case has been throughout the illness under the care of an efficient and conscientious nurse, it is advised that it be practised."

I should be delighted if I could see my way clear to advocate the abolition of a practice which costs money and which causes much discomfort. I am hopeful that in process of time I may be able to take such a position. Meanwhile, in the absence of conviction, though with a real desire to be convinced, I sit wary and uneasy upon the fence.

WHY FEDERAL LEGISLATION IS NECESSARY IN ORDER THAT VENEREAL DISEASES MAY BE EFFECTIVELY DEALT WITH IN CANADA

BY PETER H. BRYCE, M.D.

Chief Medical Officer, Interior, Ottawa

IN discussing a subject of such wide reaching importance as legislation dealing with venereal diseases effectively, it is well for us to refer briefly to the history of legislation dealing with other difficult public health problems. I recall the remarks of a Kentucky legislator at a conference of State Boards of Health, held many years ago, with regard to the isolation of smallpox and other acute diseases. While commenting upon the thorough-going methods which were advocated at the moment for dealing with smallpox, etc., he said that he did not know how it was up in Canada where they seemed to be able to do these things; but if anyone attempted to put compulsory isolation in force in Kentucky it would have to be by a shot-gun quarantine of the most positive character if it were to be successful. The history of public opinion in the matter of compulsory notification of tuberculosis is equally interesting. In 1894 the Board of Health of New York City notified physicians that it was prepared to examine the sputum of suspected cases of tuberculosis and invited their co-operation. In 1896 this routine had become so well established that the Board made notification compulsory and in 1912 the rate of notification was 2.9 for every death recorded in that city. The decline in the death-rate since 1896 had been nearly 50 per cent. The same history of progress in dealing with tuberculosis has been seen in other countries as in Great Britain and Canada; while it can be asserted that the progress of medical knowledge with regard to tuberculosis and venereal diseases, as with diphtheria, plague, etc., has been accompanied by an elevation of our ethical views in the matter of our duty to the public in controlling such diseases. But this appreciation of duty

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grows also in the mind of the individual whose knowledge regarding the disease he may be suffering from increases. He also will develop an increasing consciousness of the responsibility which he owes to the public as well as himself of protecting against dangers of which he may be the direct agent.

It has been the growth of exact knowledge with regard both to the cause and clinical and bacteriological phenomena presented by syphilis, which has especially drawn medical attention, and with it that of Society, to the extreme importance which the prevalence of the disease and its persisting results produce, that have brought about legislative action by Departments of Health and social workers in those countries having the most progressive governments. It is ten years since Wassermann worked out the reactions associated with blood from patients suffering from syphilis; while the later discoveries of Noguchi of the spirochæte as the cause of the disease have enabled the most progressive Boards of Health to give official sanction to work undertaken with the idea not alone of diagnosing cases of this disease, but of organizing effective steps both for its cure and its prevention. Since the year 1911 the Department of Health of the city of New York, stimulated by the positive results obtained by Biggs through the compulsory notification of tuberculosis, has undertaken officially to supply means for the routine examination of all patients, suspected of suffering from the disease, whose blood was sent to the Department by physicians. In 1912 a clinic was established by the Board of Health to which patients were free to go and have the test made. So naturally has the demand increased during the past six years that clinics have been established in the various boroughs of the City of New York. These are open every morning and several nights a week and the attendance at these and the number of specimens examined may be judged from the fact that in 1916 the average daily attendance at the clinic was sixty-two, and the number of blood examinations made in the year fifty-six thousand. It had been the work done under such conditions along with the official action taken in Denmark and one or two other countries for not only the official treatment of patients, but for the compulsory notification of cases by doctors having charge of such to the health authorities, which have been the means of bringing this whole problem both from its medical and its social stand-points before the attention of the legislators of many countries as Australia, Great Britain, and some of the States of the American Union and Canada. The presence of the millions of men in the armies in the field and the attention which the prevalence of venereal

disease amongst the soldiers of the various armies has forced upon the officials' attention of the Army Medical Service of every country, have still further brought into prominence the very serious effects resulting from the prevalence of the disease and the urgent demand for legislative methods adequate in some degree to control it. In Great Britain in 1914 a Royal Commission was appointed to study the various phases of the venereal disease problem and in 1916 brought in a report making a series of definite recommendations which have been in large degree put into effect under a bill known as the Venereal Diseases Bill. This Bill is during the present session being amended by further legislation intended to make its operation still more efficient. The methods, which are to be put into force by the Medical Officer of the Local Government Board whose position represents that of the official health officer of each province in Canada, are similar to those for enforcing the law regarding other contagious diseases so far as the two classes of disease are comparable, while the local county health officers are required to undertake the duties within their respective districts.

Briefly what has been undertaken in Great Britain is that literature is distributed by the Local Government Board through the County Boards of Health to all practising physicians in the United Kingdom, supplying details of the requirements of the Act and of how the Department is prepared to assist physicians in caring for their patients, who suffer from these diseases. The Local Government Board requests County and Borough Officers of Health to make arrangements with one or several general hospitals within their area for providing special clinics for both the free diagnosis and treatment of cases of this disease who apply directly to the clinic or are referred to it by practising physicians. The Boards of Health have to be sure that the clinicians especially appointed to the work by the hospitals have had special training in laboratory technique, both for the diagnosis and the treatment of cases. These clinics and their officers have further to be approved by the medical officer of the Local Government Board. The work has been rapidly pushed forward since the beginning of this year in England so that some three fourths of the Borough authorities have already complied with the requirements of the regulations so far as the clinics in the several Health districts are concerned. When such provisions have been supplied by the local authorities the Government Board at once undertakes through general supervision the carrying out of the Act throughout the whole country. It further provides that 75 per cent. of the expense of the work thus

carried out by the local health authorities shall be borne by the Government. This goes even so far as to provide for the free transport of poor patients to the several clinics.

Such in general outline is the scope of the Act in England, intended to limit the prevalence of this, the most serious of all constitutional diseases.

It is evident that nothing except the most thorough co-ordination of the machinery both of the general and local governments assisted by the practising physicians, can serve to seriously lessen a disease whose origin and dissemination are in a category so different from that of the ordinary contagious diseases. It has been of course at once recognized that two essential difficulties attach to the successful dealing with the disease, viz.: that of obtaining knowledge of the existence of cases and that of regulating the actions of patients after they have come under treatment. In 1913, in four of the best New York clinics 8 per cent. only were discharged cured, 17 per cent. ceased treatment of their own accord and 70 per cent. ceased treatment unimproved. In the best Boston clinic 12 per cent. were reported cured. With regard to the first point, there has been raised with much persistence the old objection which has been raised with regard to every disease known to us, that of the individual rights both of the patient and of the private practitioner. As we recognize to-day, such presumptive rights have no ethical reason in their favour if in any way they contravene laws which are for the general good of the community. But it is being rapidly recognized with regard to these diseases, as well as others, that the individual interests of the whole community will best be conserved when official knowledge exists regarding the existence of cases so that they may be assured expert treatment; while at the same time they may be prevented from becoming a direct danger to the public. We thus see that it is merely a question of present judgement on the part of the public health authorities of any country to determine at what moment and in what manner official notification of the existence of cases can be brought about. The advantage of having clinics officially recognized, where trained physicians will be present not only to diagnose but to carry out treatment in the most scientific manner possible, makes it evident that the regulation of cases will soon become generally viewed from the standpoint of the advantages it brings to the patient himself. But the advantages of such registration and clinics for treatment extend very much farther than to the patient alone, since they at once bring those of ill-regulated lives into touch with authorities, who are going in

large measure to enforce rules of conduct which will prevent such patients from becoming a danger to others during the period of their treatment.

The discussions of the situation at public meetings recently in London disclosed the fact, brought forth by the Attorney-General, that there was nothing in the existing law of England, which rendered it criminal for a person suffering from venereal disease, and being cognizant of the fact, to communicate the disease to another. This matter is also being remedied by the amendment to the Venereal Diseases Bill, at present passing through the House, making further provision against the treatment of cases of these diseases by unqualified chemists, non-registered practitioners and other persons. This legislation prohibits any advertisement by public notice or printed circular or by label of any medicine for the prevention, cure or relief of such diseases. The reasons for such amendments are obvious from the evident fact that it is only by treatment of an exact scientific sort, accompanied by examination of blood from time to time by trained men, which will enable the progress toward cure of these cases to be accurately estimated. Such provisions are further in the interest of the patient and are essential in order that when cured he may receive a certificate to that effect, which will render him free from danger of prosecution.

From what has been said it is therefore apparent that any scheme which is going to deal effectively with this disease must be not only of a scientific but of a most comprehensive legislative character. If the law should seem drastic it must be remembered that nothing can be too much so if it shall succeed in protecting innocent persons from the danger of infection with a disease whose transmissibility may go on from generation to generation. Until quite recent years what to do could not be determined because the proof of the cure of the disease through actual blood tests was not possible. On the other hand, it is quite apparent that no measures of a legislative character other than those of the most scientific kind ought to be adopted, otherwise the benefits anticipated will be seriously curtailed by unfortunate results growing out of inadequate treatment and certificates of cure issued contrary to the actual facts.

In Canada, as elsewhere, the centres where these diseases are prevalent are always those where are aggregations of people in cities, in camps and in other centres resulting in a more or less unstable and drifting population. In centres where adequate sanitary organizations and Health Acts and regulations are already

in existence a routine may easily be adopted adequate to the needs of the situation as seen when outbreaks of smallpox for instance have to be dealt with. It is in such centres almost everywhere to-day that hospitals exist to which are attached physicians who shortly could be effectively trained for the scientific treatment and management of such cases. It goes without saying that to obtain adequate results a definite expenditure of public funds will be essential; but no objection can be raised on this ground, because the public realize that it is itself that is being protected. The very nature of the case, however, makes it evident that it is unreasonable and unfair to place the expense of the free treatment of patients upon any particular municipality and hence it would result as has been realized in England that the general Government is the authority most immediately concerned in the interests of the whole people in enforcing the provisions of any Act of the kind indicated. But more than this, the expenditure of funds, whether federal or provincial, must carry with it an assurance that the regulations for carrying out the Act will be not only comprehensive, but also be the same for every Province and district in the country and further that with the regulations will go provisions for harmonizing and co-ordinating through official inspection the work in all the hospital centres, especially organized for it. It is as if we were supplying uniform weapons and explosives for a whole army, which would be of the same quality and effectiveness for every unit. It is to be hoped that in Canada the serious dangers already existing, and which war conditions will serve to accentuate, will result in the early adoption of legislation and regulations adequate for the purpose of limiting the prevalence and lessening the ravages of this type of disease.

I have not touched on the point of notification and registration of cases of these diseases, since it is apparent that with the establishment of special clinics and the supplying of free salvarsan treatment, the desired ends of scientific inoculation and supervision of cases will automatically follow if certificates of cure can be given only through official channels and the absence of such make the liability to criminal prosecution for violation of the provision of law against contact always operable. It is, however, apparent in view of the diversity of provincial health laws and the supervision of hospitals and similar institutions in Canada that some general federal legislation for all Canada is essential to the successful treatment and control of venereal diseases. Assuming that the methods being worked out in Great Britain are applicable here, the situation

demands that there shall be a Public Health authority in Ottawa to administer through Provincial Boards of Health and Hospitals the details, while arrangements must be made with provincial hospitals whereby skilled clinicians will not only diagnose the disease, but administer the specific cure. They must register all patients on common forms and keep careful records of cases. Should a patient move from one province to another he would continue to be amenable to the same laws and penalties for its infringement. Moreover such regulations would provide for the payment of a definite proportion of the cost of administering the law and the treatment of patients by the federal authorities. By such provisions the clash of interests which has been the case with tuberculosis cases regarding the responsibility for the cost of patients moving from one province to another would be avoided. The work would be standardized and the same authority that now deals with immigrants at our seaports would assume control of them after admission during their probation period. What the situation seems to demand is a resolution setting forth the dangers to the public and to the nation of the presence and continued prevalence of venereal diseases amongst the people, the existence of well attested means of treatment and cure and a statement both of the need for federal legislation to co-ordinate official action between the federal and provincial authorities and some indication of how this can best be brought into effect.

NEARLY one hundred English nurses have been awarded the soldiers' silver medal "for bravery in the field". The French army has conferred the Croix de Guerre on Nursing Sister Anna MacKinnon, a British Nurse attached to the French Flag Nursing Corps.

Three American women doctors have received Lieutenants' commissions in the French army. They are Dr. Caroline Finlay, Dr. Anna von Sholly, and Dr. Mary Lee Edward, all of New York and attached as surgeons to the military unit of the women's overseas hospitals. The three received decorations from the French Government for excellent surgical work recently performed under heavy bombardment, and after that their commissions. The French surgeon in command of the hospital at the front in which they were working has given them the highest praise, and has been quoted as calling Dr. Finlay a "model surgeon".

ADVANTAGES OF THE EARLY DIAGNOSIS AND TREATMENT OF SYPHILIS

BY G. ORVILLE SCOTT, M.D., *Captain, C.A.M.C.*

THE idea of my paper this afternoon is to avoid theory; to evade the pathology, but to try and convey to you all the importance of early diagnosis of syphilis. If I can impress this fact, and if every medical officer here regard any sore on the genitals as specific until proved otherwise, then we have expended our time to the greatest advantage and actually saved this afternoon thousands of dollars to the government, increased the efficiency of every unit in this area, and greatly helped to keep our overseas divisions up to fighting strength.

As you all know, the disease of syphilis is caused by the entrance into the tissues of the *treponema pallidum*; its methods of entrance are in order of frequency: coitus with an infected person; contact other than sexual, with diseased individuals; congenital, and lastly, those we occasionally see where it is absolutely impossible to trace the mode of entrance, or connect them with a specific history in any way.

The incubation period is, beyond a doubt, very much shorter than many of us were led to believe a few years ago. I have personally examined many cases who developed a primary sore one week after contact, from which the *treponema pallidum* could be obtained. Of course, in forming an opinion of incubation periods, you must necessarily take into consideration the man's statement, and also his intelligence. However, there are cases I know where it was a physical impossibility for the man to have had any contact with a member of the opposite sex for months previous. I cannot say what the maximum incubatory period is; it may be three or four, or more, months. I am particularly dwelling on this subject as I see cases nearly every day in which the medical officer has been led astray, and temporarily put off the diagnosis. Men come to me, late in the primary stage, and often not until the disease becomes clinically generalized, with the same story; that is: "I reported to

Read at a meeting of Clinical Society, Canadian Hospital, Etchinghill.

my medical officer the first day the sore appeared. He told me not to worry, as it was too early to develop any specific infection. Keep it well washed with any antiseptic, and it will soon disappear."

The man naturally labours under the faulty delusion that it is only a chafe, or was caused by uncleanness. The result is a false sense of security; meanwhile the chancre continues to develop, and the patient may not report again till the secondary rash appears. As for the chancres, they vary from the most innocent looking erosions to the malignant phagadenic type. They are, often as not, multiple, and may be located anywhere on the body. I shall deal with those on the genitals first. The most common site in order of frequency is in the sulcus; the roll of the prepuce; on the body of the penis; on the glans; on the scrotum, and intra-urethrally. The commonest type of sore seen is the papulo-erosive. There is very little loss of tissue; the surface inflammation is practically negative; the base is clean, with slight serous exudation and induration is always present to a greater or less extent. This latter characteristic being the most diagnostic feature. Very frequently in the hospital, we find cases who have been under treatment for gonorrhoea developing a small indurated area on the mucous membrane of the roll of prepuce. There has as yet been no loss of tissue; that would take several days longer.

Cases of this kind should receive most careful consideration. The patient should be sent to the laboratory, the mucous membrane over the indurated area denuded and a smear taken. Provided it be negative, the process should be repeated the following day, and so on till you have absolutely satisfied yourself and are positive in your diagnosis. It will only be a matter of a very few days till the experienced syphilologist can make a diagnosis. The condition will, in all probability, develop into a typical small, papulo-erosive chancre, that will clear up in a week under proper systemic, as well as local treatment.

In the primary stage of syphilis, the medical officer can look for only one other clinical diagnostic feature, *i.e.*, the lymphatic system. At the time of even the first appearance of a chancre, however insignificant it may appear, the inguinal gland will give you that typical shotty sensation on palpation. Following very rapidly on their appearance, the posterior cervicals will become involved; also the axillary and epitrochlear at a little later date. Personally, I place most diagnostic value on the shotty cervicals. To make a diagnosis of syphilis in its primary stage, we have the following to guide us: the sore, the lymphatic system. These are

the only clinical evidences we have. But here the laboratory comes to our assistance with the invaluable dark ground smear. It is absolutely useless to do a Wassermann test. The report, provided it is the patient's, of luetic infection, will be negative, and will only mislead both the patient and his physician.

Provided the medical officer can appreciate what he can see and feel, and be familiar with the technique of the dark ground smear, or else have the assistance of a pathologist, there is absolutely no excuse in making a faulty diagnosis.

I have referred to the most common type of sore. The next in frequency is the papulo-ulcerative variety, in which there is considerable loss of tissue. The base is usually dirty, and the induration is marked. There is usually more surface inflammation; glandular involvement will be more pronounced; but in the inguinal region only; occasionally the condition advancing to suppuration.

The third distinct type of chancre is the phagadenic, which fortunately is comparatively rare, as compared with the above two. It is intensely malignant in type, and may involve a large area. It responds only very indifferently to local, as well as systemic treatment, and if left untreated may cause a gangrene of the entire penis. I have had three cases in the past month that were admitted to the hospital just one week after the first appearance of the sore. In two of these cases, the ventral surface of the glans, the entire prepuce, and the urethra, to the fossa navicularis, sloughed away. The third lost almost one half of the glans, and the ventral surface of the prepuce, but fortunately the urethra was not involved.

These, of course, are the more malignant type of phagadenic chancres. In any case of this type of sore, there is an inguinal adenitis, which may or may not suppurate. The cervical glands, in all types of chancre, on the genitals, retain their typical shotty characteristics. It might be well to mention here that no caustic or antiseptic of any description should, under any condition, be placed on a sore before a positive diagnosis is made. The caustic would alter the appearance and characteristics, while an antiseptic solution, not altering the clinical characteristics, would exclude the possibility of a positive dark ground finding. Extra-genital chancres may appear anywhere on the body. The most common sites are, in order of frequency, in the neighbourhood of the symphysis pubis, on the inner side of the thighs, on the lips or chin, on the fingers, and on the tongue. The types seen are the papulo-erosive or the papulo-ulcerative. Personally, I have never seen phagadenic chancre extra-genitally. The same general clinical picture

is given, and, of course, the patient should receive the same routine treatment.

If primary syphilis be not early diagnosed and treated, it becomes rapidly clinically generalized; the average time being from three to six weeks. However, it may be longer or shorter. In this condition, of course, the diagnosis is comparatively easy; for, in addition to the chancre and glands, you have the skin and the mucous membranes to assist you. The chancre, provided it has received no local treatment, may have healed, remained stationary, or increased in size; this, of course, depending on the type of original sore. The glands will be practically identical on palpation, but a greater number will be involved. The skin will show a rash which, in the case of syphilis, is characterized by the following: wide and symmetrical distribution; presence of different types at the same time; absence of irritability; uniformly round in shape. The first cutaneous manifestation of generalized syphilis is the faint rose-coloured rash that appears on the trunk, the favourite site being the abdomen. In its earliest stage it is sometimes very difficult to detect. The appearance of the skin is best described as a mottling. The rash remains only a very short time, and will fade even without treatment. One injection of salvarsan, or one of its many substitutes, will cause it to completely disappear in a few days. The second rash that appears is the maculo-papular; the most common variety being the condition in which the macular characteristic predominates. It appears first on the abdomen, and flexor surfaces of the upper extremities, but very rapidly extends over the entire trunk and arms. Its colour, while not pathogomonic, is fairly constant. It is first pinkish in hue, deepening in shade, and then gradually becoming brownish in appearance, and covered with a dry scaly surface. Where the papular variety predominates, the face is practically always involved, in addition to the trunk and extremities. The forehead, at the junction of the hair, is a favourite site; and, if untreated, it rapidly spreads over the scalp and entire face. The papular skin condition is never seen alone. The papules appear to be superimposed on the macules. In colour, the same general characteristics as in the macular variety are seen, except that the shades are more pronounced; but the papules go on to desquamation in the same way. Where the papular characteristic of the rash predominates, the pigmentation persists for a very long time; we see many cases at the hospital where it has remained for months, even though the treatment has been intensive. In forming our conclusion on the etiological factor of a rash, we must of

course consider the acute exanthemata, and drug rashes. The history and concomitant symptoms, the absence of any marked pyrexia, coryza, or conjunctivitis, or gastric disturbances, should render the diagnosis comparatively easy.

The mucous membranes in this stage are also involved; the throat is always injected and the pharynx granular. This condition always appears to be present in conjunction with the cutaneous eruption.

Of greater diagnostic value, however, are the mucous patches, which are almost constantly seen when the rash on the body is well developed. The pillars, tonsils, uvula, soft palate, buccal, mucous membranes, and posterior wall of the pharynx, are covered to a greater or less extent with a thin, pearly, greyish membrane; also the tongue usually shows numerous small superficial ulcerations, covered with this same coloured membrane. Where it has been removed, it leaves a beefy-coloured, shallow ulceration. There is no pain connected with this condition, and the voice is frequently husky. About the anus and the fold of the nates will be very frequently seen condylomata. They are usually roughly circular in outline, heaped up, deep purplish in colour, and moist on the surface. About the anus they have a tendency to recur, and are sometimes diagnosed as hæmorrhoids. In the intertrigonal space, and on the scrotum, secondary syphilides are frequently seen. These are identical with the condylomata, about the anus. If there still be any doubt about a diagnosis, the Wassermann test can now be applied with a reasonable expectation that it will show a very strongly positive reaction.

There are some individuals, I understand, who will never show a positive Wassermann at any stage, and others who will show a positive reaction a few days after the first appearance of the sore. But these, however, are the exception.

The laboratory substantiation one looks for is a positive dark ground smear in primary syphilis, and a positive Wassermann when the disease becomes clinically generalized.

Our statistics at Etchinghill Hospital show that if a patient be admitted here in the early stages of primary syphilis, his average stay in hospital would be twenty-one days. At the end of this period he has no open luetic lesions, and is therefore not a menace to his associates. He is discharged from the hospital to his unit, but is obliged to return here at stated intervals for the completion of his course, which would require thirty-six days, and thus would

be available for a draft to France in fifty-seven days from the time he was first put under treatment.

On the other hand; if a patient be not admitted till he develop secondary lesions, his stay in hospital as an in-patient will be only slightly increased, averaging twenty-two days; but he will have to continue reporting at stated intervals for treatment over a period of about one hundred and sixty-five days. During all this time he is physically unable to perform full fatigue, and of course is not available for a draft. The balance sheet stands as follows in the majority of cases: Primary syphilis, available for France in fifty-seven days; generalized syphilis, available for France in one hundred and eighty-seven days.

In conclusion, it can be seen how absolutely essential it is that we at Etchinghill have the co-operation of all medical officers in this area. Those few short weeks between the appearance of the primary and the advent of the secondary symptoms, make a difference of almost three times the length of treatment required. What is of infinitely more ultimate importance to the patient and the State is that the primary cases are probably permanently cured, while the generalized ones will, in a large percentage of cases, require further prolonged and intensive treatment.

VICTORIA has delegated its City Council to forward a communication explaining the city's proposition to the federal government regarding the consolidated military hospital scheme. The city has offered the Elk Lake area to be used as a site for the proposed central hospital, free of charge, together with free water, for so long as it may be required for hospital purposes, the loan to extend until two years after the expiration of the war. The Hon. Martin Burrell, Secretary of State and British Columbia's representative in the Cabinet, has addressed a letter to Mr. Hannington, the city solicitor who has acted for the Council in the negotiations, stating that there was no possibility, as far as he knew, in any contingency, of moving the present hospital establishments at Esquimault and Resthaven.

THE PREVENTION OF WAR NEUROSES

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CERTAIN facts established by medical officers I desire to bring to your attention. The war neuroses do not occur in regiments under certain medical officers or line officers; nor do they occur in soldiers who have severe wounds or severe organic disease; nor in prisoners of war; nor in all of the soldiers exposed to shell explosions. Furthermore, these neuroses do occur not only in soldiers who have been in action, but also in soldiers who have not been overseas.

It is evident that running through these diverse conditions there are some factors which tend to prevent the development of neuroses. It is the purpose of this paper to discuss the factors which tend to avert neuroses—that they may be developed for the benefit of soldiers individually and collectively.

At first glance it would seem that the removal of prisoners from the zone of exploding shells would account for the absence of neuroses, but the evidence of like neuroses in soldiers who have never been overseas, or who have not been in action, indicates that distance from danger does not prevent their development. In other words, it is not necessary, first of all, nor eventually, to stop the war in order to prevent neuroses.

Efforts on a large scale have been made in recent years for the elimination from armies of men whose constitution makes them unfit for service. Individuals who are insane, or who have ever been insane, psychopathic individuals, constitutional defectives, and men who for six months immediately prior to enlistment have been incapacitated from work because of a neurosis, are exempted from service. Men who have chronic neuroses, and who have not been incapacitated six months prior to enlistment, although in previous years they may have been away from work for a great many months are accepted for service. This systematic procedure

keeps undesirables from getting into the army. There still remain the tasks of preventing the incapacitation of men who are already neurasthenics on admittance to service, and of preventing the development of neuroses in the average normal soldier, and in the high-grade, intelligent officer, to both of whom there are so many opportunities after mobilization for maladjustment.

Theoretically discipline tends to control men. Soldiers and officers are put through a training calculated to dominate them so completely that even under stress of adverse circumstances they would react in an habitual way. In other words they are taught adjustments beneficial to service, but their training is directed more to their bodies than to their spirits. Military writers on the science of war have lamented the lack of definite instruction of officers and soldiers in the development of *morale*. The management of emotions has always been left to the individual line officer who has himself had no formal instruction in dealing with the rise and fall of morale either in individuals or in troops. As a result soldiers and officers are carried along by routine and sheer force, and are treated by the system of reward or punishment according as they are contented or discontented, more intelligent or less intelligent, normal or neurotic; or in other words, according as their behaviour is a good adjustment of a maladjustment. Obviously army training and discipline were never intended to be particularly beneficial for nervous soldiers nor systematized to the end of preventing nervous breakdowns. Discipline actually compels adjustments rather than prevents maladjustments.

There are reasons for believing that there can be preventive measures on a large scale. Before Pearce Bailey's book, "Accident and Injury," came out in 1898, there were a great many patients every year who claimed damages from railroads for functional nervous symptoms following railroad accidents. Through the agency of this book, not only patients and doctors, but lawyers and the general public came to know that people were not entitled to functional nervous symptoms just because of accidents, and now traumatic hysteria is practically a thing of the past. War neuroses are but varieties of traumatic neuroses; if one form can be eradicated, so can another form.

There is evidence immediately connected with the war. On their return from France, some Canadian soldiers and officers with whom I talked at length, told me that they believed they would have avoided their symptoms of nervousness if they had only been told by some understanding person that the fear they experienced

was nothing to be ashamed of, and had they been helped to regain their self-confidence or self-esteem. They stated that they thought there would be definite benefit to the army from straight talks to soldiers about fear.

A line officer returned to Canada after having spent many months at the front, on being asked about his experience with nervous symptoms in soldiers, told me that he had heard of their existence in the army but that none of his own soldiers had broken down; he considered that it would be a personal disgrace if soldiers broke down under his charge. C. B. Keenan, Lieutenant-Colonel, C.A.M.C., told me that he believed that if soldiers were managed properly there was no need for them to be disabled with nervous symptoms.

There is a story of one of the clearing stations in France where the medical officer in charge said: "Hello, here are twenty cases of shell shock from the — regiment. We have not had any shell shock from that regiment for six or eight months. I wonder if they have changed medical officers." On inquiring he found that the medical officer who had been in charge was away on furlough and that after a strange officer came on duty there immediately developed these twenty cases of neuroses.

D. K. Henderson, Captain, R.A.M.C., was in New York this winter after having spent six months as battalion medical officer at the front, following an experience of ten months at the Lord Derby War Hospital in caring for large numbers of nervous soldiers. When I asked him about the difference in symptoms of cases when they got to England from those at the front, he said that it had been a great surprise to him, but that not one of the men under him, in the six months that he was battalion medical officer, developed a neurosis. He stated that he was on the look-out for these cases as he was interested in them, but that although his soldiers were subjected to the same stimuli which the soldiers in the Lord Derby Hospital stated had incapacitated them, his soldiers had not broken down.

Not only is it theory that the war neuroses can be averted, but it is certainly fact that certain officers have actually avoided them. If measures on a small scale can be successful, so can measures on a large scale.

Let us see now what is done by these line officers and medical officers who avert incapacitating neuroses. First of all they carry out the army regulations existing in all countries directing them to look out for the welfare of their men. They look after the physical

comfort of their men by arranging for blankets, sleep, and food, and make the soldiers feel that they are really interested in their well-being. They consider their troops to be made up of individuals, and in their personal contact with them, discriminate between different kinds of men, using judgement in dealing with them. Some captains make a point of being able to call privates by their nicknames and of knowing their family stories. Most of the higher officers consider it an impossibility to know intimately every private, but they expect the lieutenants, and particularly the sergeants, to have a pretty careful knowledge of every private. In this way they make subordinates feel that they are considered as individuals and not as mere cogs in a machine. These officers know, too, that privates and stretcher-bearers are connoisseurs not only of officers' leadership but also of the morale of individuals. They find that bets are made as to which men are going to break down, and just how soon these particular men will be sent back of the line with the so-called shell shock. This knowledge, gleaned as it is from more or less inaccurate and unscientific sources, is nevertheless valuable enough, they consider, to be investigated. An officer then has the opportunity of passing down the line to make observations for himself or of summoning the candidate.

The line officer rather than the medical officer has the first opportunity for this first aid to a man whose behaviour is noticed to be different than usual. It is necessary, first of all, to tide this man over his immediate stress, and later to relieve him altogether of his discomfort. The soldier is ordered to fill sandbags or to do even unnecessary work that has been devised for the occasion. If work alone isn't sufficient to steady his nerves, he is placed between two veterans who are instructed to look out for him, or he is kept in tow by the line officer himself. One officer told me that he did not allow a certain nervous soldier out of his reach for several days until the fellow was steady enough to manage himself alone. Keeping a man busy is but a mechanical means of transforming his emotions from one kind to another; talking to a man is another means. It does not matter temporarily what means is used, provided the reaction proves progressive rather than regressive.

An officer criticizes a trembling soldier for some trivial fault, planning to arouse not shame, but a desire to make amends. He goes down the line chatting casually with a nervous soldier, discussing affairs at home, until in a twinkling the soldier recovers his self-possession. To a man who has tears in his eyes he gets off a joke that produces a hearty laugh, and to the next soldier who is

hesitating about going over the top, he gives an unexpected jab with his bayonet, causing the soldier to let out an angry curse until he turns around surprised to find the officer there. This anger which superseded the hesitation is quickly replaced by chagrin and then by a desire to make good in the eyes of his beloved officer. This officer goes on down the line. He shouts to a surly chap, "Why the hell don't you get on your job?" and in the next breath, he whispers to another, "I'm scared, too, but I'm not going to quit, are you?" Now he comes upon a soldier just excavated from a heap of dirt following a shell explosion. He looks at the man on the ground; no medical office is near, so he quickly manipulates the arms and legs and finds that no bones are broken and that there is no oozing blood. He helps the soldier to his feet and says, "Well, old top, they didn't get you after all. You'll be all right in two minutes. I say, Tommy," addressing the nearest man, "you get busy fixing this trench and have this fellow help you." And as the officer comes back through the line a little later he finds the man, who had been blown up, again at his post, slaps him on the back and says, "Well, I'm glad they didn't get you. You're all right now, aren't you?" and leaves him comforted, and determined to get even with the Hun. Rarely has this officer found it necessary to say to a man, "If you don't carry on, I've got a bullet for you."

If at the end of the day the officer hears that one of these men is still unsteady, he hunts him out or sends for him and demands, gently or abruptly, as is best suited to the soldier, "Come now, tell me, what is it that is *really* troubling you?" And then he gets the story that something has gone wrong at home, that he is discontented with trench life, is afraid, or is fed up with the whole show. Patiently the officer listens, and talks in a way that is not too fatherly, too friendly, nor too authoritative, until the soldier leaves calmed, ready for the future. The officer goes to sleep feeling not only that he has steadied the soldier, but that by preventing the soldier's collapse, his own reputation was saved from disgrace.

No person is ever subjected to such an unleashing of primitive emotions as is a man in the service, and if ever one needs help in managing his emotions it is in time of war. The brunt of the management of soldiers falls to the line officers, and that of the officers to higher officers, but that part which relates to the health naturally should and does revert to the medical officer. Soldiers are more open to suggestion and are more likely to be impressed by the advice of the medical officer than are civilians by a physician, because men in uniform are trained to the habit of accepting without question the statements of those in authority.

Soldiers know, too, from their experience in earlier life that a physician comes into a personal rather than a business relationship with them, and they prefer, when their emotions are upset, to deal with a medical officer rather than with a line officer. They expect a physician to understand their mental as well as their physical ailments.

Now a medical officer does not actually come in as close contact with troops as the line officer, and yet the troops all know him and what he stands for. Soldiers find out very quickly whether the medical officer is going to treat them as human beings, or is going to assume *a priori* that all soldiers are "swinging the lead". They know from the talk that disseminates from nervous soldiers who have been on sick parade, whether they can trust a medical officer with their personal problems.

Some medical officers realize the situation. They know that they cannot talk to each soldier separately, but they also know that the morale of the troops may be the morale of the neurotic soldier who comes in complaining at sick parade, and they take particular pains to keep that neurotic contented at his post. They know that the neurotic is the soldier who spreads talk, and that good advice given him is going to reach many others. In addition, some medical officers have a system of talking to line officers, non-commissioned officers, and particularly to ringleaders among the privates about the relationship of emotions to health, in order that they may in their conversations with others use his authority as physician in giving out this information. For, as Napoleon said, it is not just before battle, but at the camp fires, that there can be the greatest effect of a speech to soldiers.

The information that writers on military science say is necessary for the development of morale can perhaps be supplied by the medical officer in his instruction about the control of the emotions and their relationship to health.

With the idea of preventing soldiers and officers from breaking down with neuroses, the medical officer can discuss their management under two main heads—discipline and education. Discipline implies the domination of an individual. When a superior does not acquire the domination of an inferior he uses force, severity, threats, and even punishment until the inferior is seasoned to taste. As the neurotic individual *ipso facto* submits to discipline less satisfactorily than a normal person, the superior increases his force, severity, threats and even punishment, expecting to get the desired results. The medical officer can explain that

although this method may tide a nervous soldier over some immediate stress, it can but serve to aggravate the soldier's nervousness, and will, if repeated, be likely to precipitate a complete breakdown. Discipline is so indispensable to military success that it cannot be relaxed for the sake of the candidate for nervous collapse. However, without the use of severe measure, by a process of education the soldier can be brought to the point of believing that discipline is a form of cooperation between officers and men, to which he willingly lends his aid until there is perfect teamwork.

The second method is by training the mental faculties. The training of the body for military tactics as regulated by the army is alone insufficient for the prevention of neuroses. Mental training should go along with physical training in order that soldiers and officers can be as prepared to deal with the emotional as with the physical side of military life. Just as the education of the soldier includes the expectation of being in battle, or of having wet feet, so can it include the expectation of being in situations which will arouse hatred, anger, jealousy, sexual feelings, and strongest and worst of all, fear. They can be taught to expect strong instincts and emotions to which they will not have a chance to react in the appropriate way. With this advance training they will not be caught unawares and unprepared.

They can be prepared to be harassed by the Hun until the fighting instinct arouses them to anger or hatred, and yet not be allowed because of military orders, to react to the emotion by fighting. They can be prepared to be in situations in which a creative instinct or a parental instinct arouses them to keen desire to take individual courses of action intended for the welfare of others and the State, and yet not be allowed because of military orders to be more than a cog in the machine. Soldiers can be prepared to expect strong sexual emotions when military orders interfere with the getting of gratification.

Soldiers can be told that accompanying any strong emotion regardless of its nature are symptoms of one kind or another, such as the rapid beating of the heart; jerky breathing; a change in the blood supply, such as paleness or flushing of the skin; perspiration; feeling of fainting and weakness in the head, abdomen, or in the legs; trembling; an increased desire to pass urine and fæces, or even loss of control of those functions. The presence of any or all of these symptoms does not at all mean that the soldier has any organic disease. The soldier with strong emotions is entitled to symptoms

and need not be alarmed about his physical state if he finds that his heart thumps, or that he loses control of his bowel movements just as he is about to go over the top. When a person fully realizes that there is no relation of the symptoms of emotions to the symptoms of organic disease, he no longer worries about himself.

It often happens that a soldier obtains satisfaction through some other instinct than the one that is aroused, as for instance, a private's fear leaves him altogether when he is given the responsibilities of a sergeant: or a soldier's fear ceases when he gets satisfaction for his fighting instinct by coming into hand to hand conflict with the Hun, or a soldier's fear is removed by the diversion of football or other sports.

Soldiers can be taught to anticipate having their personal tendencies or desires frustrated by military orders, but they can be taught also that the advantages to the State of having a perfect discipline are also advantages to the soldiers themselves in giving them a protection which they could not have if they yielded to their own impulses. Soldiers can be made to understand that sacrifice of their personal desires is in reality not a curtailment of their getting satisfaction out of life, but the best means of preserving their own lives under conditions of war.

When military orders interfere with the obtaining of satisfactions of emotions once started, and appropriate responses cannot be given to them, attempts to suppress them only serve to aggravate the symptoms, as in the case of a man whose symptoms become increased when he cannot extricate himself from danger and when he tries to hide his fear. Any emotion ought to be recognized and dealt with rather than suppressed, particularly if it is repugnant to or incompatible with one's ideals. Frequently difficulties arising in soldiers, and especially in officers, are due to the fact that the expression of fear is repugnant to the ideals of patriotism and duty. Fear in a man urges him to get out of danger, and his ideals tell him to be steadfast and worthy of the name good soldier. Fear makes a man say to himself, "God, I'd like to get out of this," and at the same time his ideals for patriotism and duty say, "Steady, old man, carry on." A war between fear and ideals is carried on inside the soldier, until he, ashamed of himself because he does not possess that bravery which he thinks should be the first quality of a soldier, considers himself an inferior creature, and suddenly finds himself in the midst of a neurosis.

The medical officer can give assurance that fear is a normal, healthy reaction to the presence of danger when one cannot get

away; that fear may be a matter of good judgement; that fear comes to every one, at some time or other, except to the insane man, and in some degree, the liar; and that fear may be acknowledged openly and frankly without any more shame of criticism than one would have in talking of anger or hatred. Soldiers suffering from war neuroses and soldiers suffering from gunshot wounds, with whom I have talked, all expressed the greatest relief when they found that they could discuss their fear without being criticized or made to feel ashamed of themselves, and they told me that they believed every man would be a better soldier if he could go through his experience with fear, and come out of it without feeling remorse and shame. If soldiers can be relieved of their self reproaches for having fear, they will no longer have that conflict in their minds which is the forerunner of neuroses.

Another point in the education of men in service is in connection with the instinct of self-preservation. Although men with fear are not taken out of danger, men with neuroses are. A neurosis is an agent which brings a man back of the line. Just as soldiers are glad to have blighties in order to get to a place of safety, so soldiers are glad to have neuroses to get to a place of safety. Despite the disadvantages of suffering there is a distinct asset in having a war neurosis in that it keeps one out of the danger zone. The open discussion of this phase of the sickness will tend toward the elimination of neuroses, but it will also tend toward the open discussion of the relation of fear to ideals, so that soldiers and officers will all realize that the existence of fear need not interfere with one's being patriotic or fulfilling duty.

All soldiers need to have help at some time or other in keeping up their confidence. Soldiers like to have constant assurance that their superior officers, the mates of their own rank, their subordinates and the civilians at home are each and every one imbued with the idea of doing their bits well and conscientiously. Then they feel confidence in others. More than confidence in others, soldiers need to have self-confidence. And only when soldiers feel their own ability to cope with the problems that reach them from home, with those that come up in military life, and with their own emotions, do they feel confidence in themselves. Lack of self-esteem is one of the worst enemies to an individual. It develops from so many causes that intelligent help from an unprejudiced officer is necessary to remove it. The development of self-confidence is necessary to the good morale of the individual; the absence of self-confidence is a symptom of a neurosis.

A soldier always recognizes in his officer a willingness to help. He quickly knows which line officers and which medical officers feel a personal responsibility for the safety, comfort and health of their men. Similarly officers are quick to sense a feeling of responsibility on the part of subordinates for their share in the Big Show, and medical officers recognize the co-operation of soldiers and line officers in their participation in hygienic measures for general benefit. The complete training of officers and soldiers includes the development of a sense of joint responsibility in which the medical officer makes use of every prophylactic measure known to his science for the health of the soldiers, in which the line officer acts as both a father and mother to his soldiers, and in which the soldier considers that his country's cause is his cause and his country's fight his fight.

In other words, when there exists a feeling of joint responsibility, the individual disregards his own interests in favour of those of others. If each individual feels responsibility for others and for the cause, there will be an decreased liability to incapacitating emotions or to neuroses.

Without self-esteem and self-confidence an individual will not be able to assume his own responsibility toward himself and others. Without assuming responsibility the individual will not have self-esteem. With a knowledge of the effects of emotions on health, and of the means for dealing with emotions, men can have increased self-confidence and a sense of joint responsibility, and willing readiness for discipline. When all these factors are developed in good proportion the officer or soldier carries on and does not break down.

Editorial

THE PRESENT EPIDEMIC

UNDER the name of "Spanish Influenza" an epidemic is sweeping over the North American Continent, more especially the eastern states and provinces of the United States and Canada, with an alarming morbidity and mortality. It is a rapidly spreading and very contagious disease which involves particularly the respiratory tract, but is associated with marked constitutional disturbances and prostration. It is said to have made its appearance first in Spain, hence "Spanish Influenza." It seems to have spread over the Continent and England where it still claims many victims. But it appears from the testimony of reliable medical witnesses that the disease in England is of a relatively benign type.

Its advent on this side of the Atlantic is of recent date. Here, as in other countries, the disease appeared prominently and severely from the start amongst soldiers, where it has been responsible for a high mortality. It appears from what reliable records are so far available that clinically, two types of cases occur—first, the simple non-pneumonic infection, secondly, the severe and frequently fatal, pneumonic type. This latter is a very dangerous, rapidly progressing, septicaemia with high fever, a curiously slow pulse, often running an erratic course, which may kill in a surprisingly short time. Between the two is no absolute separation; type 1 may either quickly or sometimes after days develop into type 2, and then rapidly lead to death. It may therefore be supposed, and this is practically the safest course, that in this, as in other epidemic diseases mild infections may, on translation into other individuals,

give rise to severe ones. It is noteworthy that the severe type affects with predilection young, strong and plethoric individuals, especially men. In them the prognosis is most unfavourable and the disease rapid. As regards the nature of the disease and the anatomical and bacteriological findings no definite final statement can as yet be made. Cases which have come to autopsy show generally a marked, diffuse, severely hæmorrhagic pneumonia, so that the lungs appear in recent state in extreme red hepatization, although the consolidation of the lung may not be complete. It is associated in practically all cases with marked sero fibrinous pleurisy. Involvement of the lung is frequently bilateral. Cases in which a more typical broncho-pneumonia occurs are much rarer. The larger bronchi and the trachea are also usually intensely reddened and inflamed, and occasionally may even show a croupous membrane. The throat, tonsils, and larynx are free. In addition to these lesions, autopsy shows the general results of marked septicæmia.

Bacteriologically, the cases appear to be mostly mixed infections. In the majority of cases the pneumococcus, in one or another strain, is recovered from bronchi, lung exudate, and pleural fluid. A number of cases also show influenza bacilli. The frequency of this finding, however, varies amongst various observers, and the proof that the bacilli found are definitely of the influenza variety has not always been furnished beyond doubt. Besides these two organisms various forms of streptococci contribute to the flora of the lesions. This is not the place to enter into a detailed discussion of these findings and their significance. Further, careful study is necessary before definite conclusions can be announced especially as to why the disease assumes in the present form such a malignant character. It may be that a symbiosis of several pathogenic micro-organisms such as influenza and pneumonia enhances the virulence of both.

One more word as to specific treatment of the disease. As might be expected the disease had not been long with us

in this country when announcements in the Daily Press of sera and vaccines appeared. These should be received with a great deal of reserve by the practitioner. In the first place, it has already been stated above that the nature of the infection as well as its extreme virulence in many cases is still obscure. In the second place it appears that most of these cases are mixed infections in which more than one micro-organism is concerned. Thirdly, even if it is taken for granted that the most important factor of this infection is the influenza bacillus, not much hope can be entertained in establishing immunity or cure by influenza vaccines, for the influenza bacillus has only feeble protecting qualities and stimulates but very feebly to anti-body formation, so that the agglutinative properties of the blood in influenza are not much more marked than in normal blood. Moreover, what little protection influenza vaccine furnishes is extremely slow in development; and finally, it is very doubtful whether in the human being any immunity is conferred by influenza infection. False hopes should therefore not be entertained by practitioners and laity that vaccine treatment is going to be of much help in this epidemic. On the contrary, it might even be that, if the vaccine be introduced into a patient ill with the virulent septicæmic type, aggravation of the disease might occur by exposing a body already swarming with dead and living bacteria to a further dose.

THE TREATMENT OF WOUNDS

THERE has been no greater field for advance in Medical Corps work than in the treatment of wounds. The sanitary personnel has done excellent work, but their good results were rather expected from the advances made in public hygiene during the last decade. To those who have seen the wounds caused by the modern missile, at the time they are produced, with foreign matter introduced in nearly

all cases, it has never been surprising that weeks were necessary before even a slight wound could be healed and the soldier returned to the line. In spite of this, wonderful results are being now got by excision and cleaning and by giving to-day the assistance that will be needed to-morrow.

Not until the last two years has much progress been made, but in that time a really phenomenal change has taken place. The good results being got now, as compared with two years ago, show us how hopelessly deficient the early surgeons were in the treatment of infected wounds. Surgery had abandoned to a great extent the antiseptic methods of Lister for the aseptic technique of the modern abdominal surgeon. The great minds were looking for new fields to conquer in the abdomen, chest, and head, with the result that the traumatisms of civil life were delegated to the juniors or even in many cases to the house-surgeon to look after.

Although we must acknowledge that surgery was caught napping at the commencement of the war and that the fight against the ravage of infection went hopelessly against them, with gas gangrene taking a terrible toll of lives and limbs; still the victory was short, as the surgeons rose magnificently to the occasion, although the difficulties were enormous. To combat the situation there was a wild scramble for antiseptics to remove and destroy the bacteria. The Carrel-Dakin, Wright's saline, the salt pack, B.I.P., Flavine and various chlorine derivatives have all their ardent followers and some their enemies. The comparative value of the different methods is to say the least still controversial. All of them have sufficient value to remove the sting of our early defeat.

The report on another page of this number by Lieutenant-Colonel Crile is interesting in several different ways. The team work in this unit exemplifies one of the great advantages the military has over the civilian hospital. The presence of a full time staff under the direction of a single chief, while

dangerous at times by throttling initiative, allows for definite experiments such as this on a large number of cases. As this is really a new field of surgery they have rightly given the younger men an equal share with the older. Undoubtedly this is a good procedure for both the patient and the surgeon.

The fact that twenty-five per cent. (one hundred and eleven out of four hundred and twenty) of infected wounds were treated successfully by primary or delayed suture would seem incredible to the surgeon of a few years ago, especially when one takes into consideration that the infection had been running rampant for nearly two days and a half. These were the worst cases too, as one third of the admissions had been put to one side as either medical cases or ones in which the wound was progressing satisfactorily. That this success was due to the surgeon's knife rather than any particular antiseptic is apparent from a study of the charts. The fact that this was an emergency method must not be lost sight of. With fewer cases and more time to devote to each undoubtedly better results would be secured and a far higher percentage would be successfully treated by primary or delayed suture.

THE terrible increase of tuberculosis in Belgium is forcing itself upon the attention of the world. Already a large portion of the population is in the grip of the White Plague. Many of the children of the cities, and in industrial centres, are in incipient stages of consumption. Malnutrition and exposure engender a physical condition which cause many thousands to become an easy prey to the disease. A type of organization existing before the war has been amplified and transformed, and is now effectively combatting the menace to Belgium's next generation. It was known as the "*Foyer des Orphelins*", formerly, but with the support of the Belgian Relief Commission it was possible to remodel the association into the "Orphanage and Anti-Tuberculosis

League''. This is directing its energies to protecting the young from the disease and restoring, where possible, those already afflicted. Unfortunately many of the institutions connected with the League have reached the limit of their accommodation and resources, and find it hard to accept limitation when so many more children are in dire extremity. An increase of 6.4 per thousand in the number of deaths, and a decrease of 8.5 per thousand in the number of births is revealed by a comparison of statistics compiled in Belgium in 1913 and figures secured by the Belgian Relief Commission at a recent date. The birth rate drops more swiftly as the days pass, and the toll of death swells with stupifying rapidity. A systematic policy of extermination has been ruthlessly pursued by Germany, and amongst the multitude of her awful crimes she presents to the world that stupendous tragedy, the childhood of a nation deliberately sacrificed.

THE American Red Cross has sent out from National Headquarters, Washington, a widespread appeal to the medical profession and the country generally. Surgeon-general Gorgas has called for a thousand nurses a week; and 25,000 graduate war nurses must be in war service by January 1st. It is estimated that before next July the demand will reach 50,000.

The fifty American hospitals representing service in France have been notified by the surgeon-general that they may invite a limited number of their student nurses to complete their training in base hospitals abroad, where they can have the privilege of rendering service at the same time. This action is the result of advices received from the Medical Department headquarters of the American Expeditionary Forces. Although many of the hospitals desired the permission suggested, until word had been received from overseas no action was taken by the authorities in America. The pupils selected will be enrolled in the Army School of Nursing; each unit of twenty-five will be in charge of a graduate nurse.

CHICAGO is becoming a disciple of the scientific method of handling crime. This method is making its way slowly but surely. The founding of the psychopathic laboratory was the first step. In early days the law presented the chief obstacle to the scientific treatment of crime. Some of the prosecuting attorneys refused to read the reports which the psychiatrist made to the judges on the plea that these reports weakened their arguments. This attitude has changed; conscientious lawyers now often bring their clients and even some of their witnesses to the laboratory.

There is a form of insanity which renders a man almost certain to commit crimes of violence. Such cases convinced Chicago that the prevention of crime is a scientific problem. Many criminals are in some way mentally defective; a large percentage of mental defectives are potential criminals, and may develop the most dangerous tendencies. Many cases are on record of a man sentenced by the court for a petty offence which has caused his arrest; after serving a few months he has been turned loose on the community, a potential murderer who soon became an actual one. Society can protect itself against the damage and expense of crime only by identifying and isolating these defectives who make up approximately two per cent. of the population. Judge Olson's crime laboratory, once ridiculed, is now supported by public opinion and has the co-operation of the police and the lawyers. Chicago is meditating the establishment therefore, of a colony in which insane criminals may be placed on indeterminate sentence, and which will be the necessary complement of the laboratory where they are identified.

Obituary

DR. J. MILTON COTTON

DR. J. MILTON COTTON, one of Toronto's foremost surgeons, died on August 11th, from a sharp attack of heart failure. He had been suffering from overwork for some time and on the advice of his colleagues entered Wellesley Hospital to recuperate, where it was thought a month's rest would fully restore him. His wife predeceased him about six months ago.

Dr. Cotton was among the best known of Toronto's medical men, and held many degrees from English as well as local universities, and in addition had been coroner for York County for the past twenty years. He was born on August 12th, 1860, in Simcoe County. He received the degree of M.D. from Toronto University, and in 1883 those of L.R.C.P. from Edinburgh University, and M.D., C.M. and M.R.C.S. from Victoria University, England. Locally Dr. Cotton had many activities; he was a member of the Academy of Medicine, Toronto; a member of the International Congress of Medicine and Surgery; a member of the American Medical Association and a member of the Clinical Surgeons of America.

But it was in his own city that Dr. Cotton was best known and widely esteemed. For fifteen years he was senior surgeon of Grace Hospital, and many in his extensive private practice testify to his unfailing kindness, his generosity, his consideration. The great and the lowly, the rich and poor, the young and old, all, in every walk of life, mourn the passing of a fine humanitarian career.

DR. THOMAS CULLEN, died on September 14th, at Baltimore. He was silver medalist of Toronto University in 1890, and from 1892-1896 was associate professor of gynecology at Johns Hopkins University.

THE death of Dr. S. E. C. Muirhead, formerly of Vancouver, took place on July 23rd, at Kingston, Jamaica, where, owing to

failing health, he went expecting the change of climate would be beneficial.

DR. SYLVESTER L. FREEL, M.D., died recently at his home in Stouffville after a brief illness. He was in his seventy-eighth year, the oldest active practitioner throughout York County.

DR. WALTER NORMAN BROWN died at his residence, 375 Spadina Road, Toronto, on August 30th.

DR. S. T. MACADAM, of Battleford, died at that town on the August 23rd. He was one of its oldest citizens having settled there just after the rebellion. His work as Indian doctor brought him a great deal in touch with the Indians and the wide district to the north, where he will be greatly missed.

DR. W. G. HUTT, for twenty years a practising physician of Newmarket, Ontario, died suddenly on August 18th.

Correspondence

E. Melbourne, Australia,

August 21st, 1918.

To the Secretary,

CANADIAN MEDICAL ASSOCIATION, Montreal,

Dear Sir: I have been directed to inform you of the dispute which has been in existence for some months between the Friendly Societies of Victoria and the British Medical Association.

The lodge doctors have been paid for the past forty years on an average as little as 14/- per annum for the town; this includes attendance upon the member and his family and works out at four persons for each payment; for the country the average is 16/- per annum per member for the lodge doctor.

For a considerable period of time we held negotiations with the associated lodges called the "Friendly Societies Association" with a view to having the rate of remuneration increased. As the Friendly Societies refused our demands 100 per cent. of the town members and 96 per cent. of the country members of the British Medical Association on October 31st last gave three months notice of their intention to resign their appointments on January 31st of this year and asked for reappointment on the terms of a Model Lodge Agreement which had been drawn up. The Friendly Societies Association refused our terms and established institutes at which the institute doctor was asked to attend from 3,000 to 5,000 patients. The government of the day was asked by the Friendly Societies to take a hand in settling the dispute, and after eight months' time a royal commission, presided over by a judge, was established to inquire into the merits of the dispute. The commissioner found that the terms asked for by the British Medical Association were just and equitable. Both sides expressed their willingness to accept the finding of the royal commission but the British Medical Association made it a condition that the institutes which had been established should be abolished. They were unwilling to see their men sacrificed for their loyalty to the association in that they had tendered their resignations and were to be left without any means of livelihood should the commissioner's finding be accepted unconditionally.

The lodges are endeavouring to extend their institutes but find a difficulty in procuring medical practitioners. One of our most bitter opponents, the late president of the Friendly Societies Association, Mr. Samuel Mauger, is now on his way to Canada, and it was stated in parliament that he purposes securing 1,000 medical men from America to fill the positions of lodge medical officers vacated by the members of the British Medical Association in what was termed by the commissioner to be "a just demand". The institute doctors are ostracised by other members of the medical profession and are not met in consultation.

My Council would esteem it a favour if you would put a "warning notice" in your JOURNAL advising any medical practitioners in your country who might think of applying for any of the positions which might be advertised in your daily newspapers that they should first of all apply to yourself for information.

By the same post I am forwarding a marked copy of our Journal setting forth the finding of the Royal Commission.

Yours faithfully,

C. STANTON CROUCH,
Secretary.

To The Editor of THE CANADIAN MEDICAL ASSOCIATION JOURNAL.

Sir:—In the September issue of the JOURNAL, there appeared an article on "The Returned Soldier", by Lieutenant-Colonel W. T. Connell, C.A.M.C. In this paper he voices some stringent criticisms of the Board of Pension Commissioners, on the grounds that they seem to have abrogated to themselves an autocratic power in the business of awarding pensions to men disabled on service, and to have disdained the assistance of the Board of Medical Officers on Discharge, so far as the estimation of the pensionability of the soldier is concerned.

His main contention is that the Board of Officers who see the man, is better able to determine his pensionability than the Pensions Board, who only see a written description of the man, can possibly be.

This argument obtains by its plausibility a force which it lacks in accuracy. The error of the assumption lies in the failure to appreciate two facts of supreme importance.

1. Pensions are awarded for disabilities or losses of normal abilities, and not for the injuries or diseases which have caused such loss.

2. The reasons for awards must be stated in clear and unmistakable language; they must be in the possession of those empowered to make awards; they cannot, under the Pensions Regulations, be made on the ground that some one, however well qualified, expresses the opinion that they are justifiable, unless the reasons for such opinions are clearly stated.

The Board of Pension Commissioners is most anxious at all times to profit by the advice and assistance of those who are mainly occupied with the treatment of war injuries and diseases. Information regarding the correctness of the award of pension, in specific cases, is sought by every possible means.

The whole effort of the Board is directed to the task of awarding such pension as the disability justifies and of assuring the award of equal pensions for equal disabilities.

I am, your obedient servant,

J. M. BIGGAR, Lieutenant-Colonel, C.A.M.C.

Assistant Medical Director Board of Pension Commissioners.

Ottawa, October 10th, 1918.

THE following communication has also been received from the Canadian Pensions Board:—

The matter of pensions for our disabled sailors and soldiers is attracting a considerable amount of attention at the present—perhaps more than that to which it is essentially entitled.

The problem of the rehabilitation of our men on discharge has not as yet been entirely elaborated, and, except in so far as the awarding of pensions is concerned, has not gained much public recognition. It is easily understood, therefore, why pensions, which after all play only a small, and in the final survey, an unimportant rôle in the plan of rehabilitation, have acquired temporarily an undue prominence.

The Government has decided that \$600.00 per annum is the sum necessary at present to keep in "decent comfort" a man, unable by reason of the injuries he received on service, to contribute to his own support. The Pension Regulations require the Board of Commissioners to decide, without any reference to previous occupation, the proportion of this sum which shall be paid to those whose disablement on service has reduced them below the normal in the pursuit of employment.

In obedience to this instruction many men have been awarded what seem to be very small sums of money for disabilities, which

on superficial examination appear to handicap them very seriously so far as their employability is concerned. One hardly need quote the case of the unfortunate watch-maker who, wounded in the right hand and therefore unable to return to his former well-paid occupation, received from a grateful country the noble sum of \$10.00 a month.

The reason for the not uncommon failure by the uninstructed properly to assess the value of such an injury, results from the fact that it has not been considered in relation to several thousand similar cases. To judge from a single individual such as the one quoted, is obviously unscientific, and yet, so far, is the usual procedure. When several thousand cases of a similar nature are investigated, it is found that by comparison with men totally incapacitated, the handicap is generously estimated at one fifth.

We are all prone to consider individual cases along lines somewhat like this: He did his bit (a most horrible phrase). He is unable to earn his living as he used to. He should, therefore, be compensated for the loss of his livelihood. He gets an absurd pittance. What is the matter with the Pensions Board?

A conclusion such as this evidences a complete ignorance of the Pension Regulations and a failure to appreciate that the apparent but not real injustice should not be laid at the door of the Pensions Board. Any cases of error of real insufficiency in award of pension should be reported to the Board, whose whole effort is to the provision of lawful and proper pensions to every one who is suffering from a physical detriment due to his service.

We should look at the matter from a broad and scientific standpoint. We should remember that there are a very large number of other trades than watch-making, to which our unhappy friend may turn, and in which he will, in spite of his disablement, as soon as he settles down, be able to support himself very comfortably. We should realize that our duty as physicians and surgeons is not finished when we have, through the exercise of our professional skill, brought a war injury or disease to its irreducible minimum.

Thoughtless agreement with the views of the apparently ill-used pensioner adds materially to the difficulty of the main task, which consists in renewing in the patients the courage and initiative, which they, as a whole, have displayed so admirably in service and, in stimulating them to the exhibition of these qualities on their return to the business of citizenship. In this way we shall best be assisting toward the solution of the tremendous problem of rehabilitation.

Retrospect of Literature

THE SPLEEN AND ANÆMIA. Experimental and Clinical Studies by RICHARD MILLS PEARCE, M.D., Sc.D., professor of research medicine, with the assistance of EDWARD BELL KRUMBHAAR, M.D., Ph.D., assistant professor of research medicine, and CHARLES HARRISON FRAZIER, M.D., Sc.D., professor of clinical surgery, University of Pennsylvania.*

THE appearance of this book is one of the events of the year in clinical and scientific medicine. By a wise combination of forces, the conclusions upon the relation of the spleen to anæmia, which have been arrived at through the admirable experimental and metabolic researches carried out in recent years by Professor R. M. Pearce and his Associates into the effects of splenectomy upon the blood and blood-forming organs, iron and nitrogen metabolism, and fat utilization, have been made introductory to a discussion of the clinical features of the various types of non-infectious splenomegalies and the therapeutic applications of splenectomy (Krumbhaar), as well as to a graphic presentment of the successive steps in the surgical procedure of this operation (Frazier). The information presented in the first portion of the book marks a definite advance in our knowledge of the function of the spleen in blood destruction and regeneration, and this is made ancillary to the discussion of the indications for, and method of, removal of the organ. The work thus sets a standard for the clinical application of knowledge gained by scientific laboratory methods to the problems of the bedside, and from this point of view alone it is of immense value. In addition, its clear description of the methods of technique followed in the various investigations made, comprehensive charting of data, well-balanced and truthful conclusions, and thorough presentation of the literature, make it an indispensable laboratory handbook, which is already on the shelves of almost every advanced worker on the problems of blood and immunity on

*419 pages, 16 illustrations in colour, black, and white. Cloth, \$6.00. Published by J. B. Lippincott Company, Philadelphia, London, and Montreal, 1918.

this continent, while the clinical facts it presents upon the obscure subject of the splenomegalies and anæmias and the therapeutic possibilities of splenectomy make it of equal value to the surgeon and to the general practitioner as well. It is well illustrated by coloured micro-photographs as well as drawings, and is completed by a rich bibliography.

The book is in three parts, by the respective authors. Part I.—*Experimental Studies* by R. M. Pearce, occupies the first two hundred pages. A historical survey in the first chapter shows that the spleen was removed from the normal animal without untoward effect upon life as far back as Morgagni, and that since the year 1875 splenectomy has been recognized as in itself, harmless, the prognosis being greatly improved under modern surgery and since its abandonment in leukæmia, in which disease it is absolutely contraindicated. The effect of splenectomy on the red cells is the main object of the experimental study, and in this connection the following facts are definitely established: (1) the occurrence of an anæmia of the secondary type, of gradual development and return to normal in six to twelve months; (2) an increased resistance of the red cells to hæmolytic agents; and (3) a decreased tendency to jaundice and hæmoglobinuria. The supposed regulatory influence of the spleen on blood destruction and regeneration is studied in the light of these facts. The experiments were done uniformly under ether anæsthesia. Removal of the normal spleen was carried out on dogs in whom thorough blood examinations and metabolic determinations had been made both before, and repeatedly after operation, and the effects of changes of diet and of hæmolytic agents upon splenectomized and non-splenectomized animals compared. The controls studied included not only the normal animal, and animals rendered anæmic by other methods than splenectomy, but animals in whom the spleen had been cut out of the portal circulation by other methods than splenectomy, such as ligation of the splenic veins or displacement of the portal vein. A special series of investigations were also directed to changes in the bone marrow and lymphnodes and to the microchemical distribution of iron. The findings of Warthin on hæmolymphnodes, and of Asher to the effect that the spleen has an influence on iron metabolism, were not confirmed. Definite conclusions upon the causation of the changes in the red cells were not reached, but it is evident among other things that the absence of the spleen itself is a factor in the causation of the anæmia following its removal, owing apparently to the fact that it elaborates a hormone which stimulates the bone

marrow to blood regeneration and which is activated in its passage through the liver, and a functional relationship of the spleen to the liver, as yet not understood, is suggested. The fatty marrow of the long bones is found to be usually replaced, some six months after splenectomy, by a red hyperplastic marrow rich in iron pigment, and the lymphnodes and liver capillary cells of splenectomized dogs which have been given hæmolytic poisons are crowded with endothelial cells phagocytic for red corpuscles, suggesting that, in the absence of the spleen, these structures assume a greatly increased rôle in blood destruction. The direct formation in the liver of bile from hæmoglobin, in which process the spleen is proved to be merely a mechanical factor, the lack of any share of the spleen in iron or nitrogen metabolism, the increase of the anæmia in splenectomized dogs kept on a cooked diet, suggesting the presence of a vitamine in this organ, are a few more of the suggestive principles elucidated. A comparison of the rather scanty literature of the findings in normal human subjects after splenectomy reveals a similar anæmia to that found experimentally in animals, thus presenting a sharp contrast to the blood crises seen after removal of the diseased organ, when the withdrawal of its toxic products evidently gives an impetus to active repair. The tenth and last chapter of Professor Pearce's contribution consists of a valuable discussion of the metabolic studies made before and after splenectomy in two cases, one of congenital hæmolytic icterus, and the other of pernicious anæmia. Only three other such studies of splenectomy have been published previously, two in Banti's disease and one in pernicious anæmia, making a total of five complete studies of metabolism before and after splenectomy in the literature to date.

Part II.—*Clinical observations by E. M. Krumbhaar* presents for the first time, in the words of the preface, "the modern views concerning the classification, diagnosis and treatment of the non-infective splenomegalies characterized by blood-destruction," and is full of practical information of direct clinical value. The detailed clinical and pathological observations given are supported by excellent coloured pictures showing the minute structure of the spleen, methods of value in diagnosis and prognosis are discussed, and special laboratory tests for determination of the resistance of red cells, evidences of bone marrow activity as shown in reticulated cells, nucleated forms and platetets, presence of agglutinins and hæmolysins in the blood serum, urobilin excretion, protein, uric acid and iron metabolism are described. The value of splenectomy as a therapeutic procedure is considered in the light of the literature.

Splenectomy is especially indicated in congenital hæmolytic jaundice and is also followed by definitely favourable results in Banti's and Gaucher's diseases. In cirrhosis of the liver, malaria, and syphilis, it is sometimes of value. Its use in pernicious anæmia is made the subject of a special study, and one hundred and fifty-three cases in which it was done are tabulated from the literature. Here it is to be tried only in favourable cases, that is in patients before the fifth decade of life, where the disease has not lasted too long and in whom the anæmia is not aplastic nor associated with spinal cord symptoms. It should be preceded by repeated transfusions, and by the removal of all points of infection such as oral sepsis.

Part III.—*Surgical Treatment of Lesions of the Spleen* by Charles H. Frazier, gives full details of the preparation of the patient for splenectomy, of the operation, and of the after care. It is illustrated by excellent drawings showing the successive steps in the operative procedure.

MAUDE E. ABBOTT

Miscellany

News

NOVA SCOTIA

THE medical profession of Halifax answered the urgent call of the State of Massachusetts for assistance to fight the spread of Spanish influenza by sending at once a detachment of nurses and doctors, which was immediately acknowledged by Governor McCall who wired a letter of thanks to the Lieutenant-Governor.

The arrangements for the erection of the tuberculosis hospital in Halifax are nearing completion, and the work is expected to begin immediately.

PROFESSOR FRASER HARRIS has completed the history of the medical aspect of the great disaster at Halifax, N.S., December 6th, 1917. The manuscript is in the hands of the Halifax Relief Commission; it is hoped that the work will be published by the Federal Government.

DR. BLACKADAR, of Port Maitland, Yarmouth County, delivered a very forceful address at the opening of the Maritime Education Convention in which he sounded a warning that if present unsanitary conditions were allowed to persist they will be sufficient to criminally accuse educational authorities. He gave statistics showing that 90 per cent. of tuberculosis in the adult is contracted before the age of fourteen. He strongly urged the teachers of rural schools to enforce a dust campaign in the school-room.

NEW BRUNSWICK

THE Jordan Memorial Hospital has passed into the hands of the Invalided Soldiers' Aid Commission. The federal authorities decided that it would be best to take over the institution, and have taken a five year lease of the hospital with the privilege of renewing if they so desire. In the agreement it is stipulated that the civil patients placed there by the province shall be looked after by the invalided soldiers' commission at a maximum charge of \$15 per week. It is probable that at the conclusion of the war the hospital will pass under entirely federal control. The Jordan Memorial Sanitarium was presented to the province by Mrs. J. Clarke Jordan who, in a letter of recent date, states she is quite willing the soldiers should have the institution.

QUEBEC

THE result of the Final Primary examinations of the Pharmaceutical Association are as follows: passed as Licentiate Pharmacy in order of merit, six; passed as Assistant-Pharmacist, in order of merit, five. The examiners were Messrs. Omer St. Amour, Ste. Agathe des Monts; A. R. Farley, Hull; O. H. Tansey, Montreal; A. E. Francœur, Quebec; M. Letourneau, L. S. Desautels, J. E. Barnabe, president, and J. H. Pilon, secretary-registrar, Montreal.

THE Department of Militia and Defence has, in co-operation with the St. John Ambulance Brigade, made arrangements for the establishment of a Woman's Aid Department (W.A.D.) for work in the several military and convalescent hospitals throughout the Dominion. This department will be organized in three divisions: (1) V. A. Division: (a) V.A.D. Nursing Services; (b)

V.A.D. Trainers. (2) Special Service Division: Masseuses. (3) General Service Division.

Each hospital will have a general service superintendent and larger ones an assistant superintendent.

At the general board meeting in September of the Victorian Order of Nurses, at Ottawa, the general superintendent gave a complete synopsis of developments of the work of the order. The map of the hospitals and nursing centres of the various provinces is fast becoming a veritable network of activity. Throughout Saskatchewan and Alberta new centres of work for the order are constantly being opened up, the most important step being the securing of the co-operation of the departments of public health in these western provinces. A fifty bed hospital will be erected at Melfort, and another hospital for twenty-five patients at Centre Butt, in each of which the V.O.N. will provide the staff and management.

ONTARIO

CIRCULARS were sent out by the Ontario Board of Health to all the doctors containing all possible information regarding the treatment of Spanish influenza and the prevention of the spread of the epidemic in the province. In response to an appeal of the American Red Cross of Boston for nurses to assist in caring for the victims of the outbreak a large party of nurses left Toronto immediately.

ONE central board of health for the border cities is now being advocated by the medical fraternity of the various municipalities, and an active movement is now on foot to bring about the amalgamation of the different boards of health, and thus simplify the work. Legislation authorizing the centralization of the work must first be obtained before the present system can be changed. The consent of the municipal councils must first be obtained and then the government approached to grant the necessary sanction. One central office and one medical health officer, it is advocated, would enable the department to be more efficiently and economically managed.

ONE of the features of the report of the Provincial Board of Health for August is reference to the serious outbreak of typhoid

fever in Chatham and Kingston. The report also refers to tuberculosis and mentions that fifty-six municipalities reported one hundred deaths. Venereal diseases are also far too prevalent in the province it states. Nine of Toronto's city hospitals have sent their pupil nurses for lectures to the University. This is a new departure; formerly these lectures have been given by staff doctors at the individual hospitals, but it has been found increasingly difficult to supply doctors. The new system will standardize the theoretical teaching given in the training schools. The Toronto Chapter of the Canadian Association for nursing education, composed of superintendents of hospitals and training schools is responsible for the change. The lectures given by superintendents and instructresses will still be continued.

THERE will be accommodation for over one thousand soldier patients in the city building formerly occupied by the National Cash Register Company. Before the end of the year the changes will be completed. It will be the central military orthopaedic hospital for all Canada.

AT the request of the Red Cross authorities in Toronto the citizens of Prince Rupert devoted a day to the collection of sphagnum moss and forwarded a full car load to the city, to be used in making dressings for the wounded men at the front.

DR. F. R. MILLER recently delivered at Hart House, Toronto University, a course of lectures on "The Physiology of the Human Nervous and Muscular Systems". The lectures were attended by the medical officers who are studying the treatment of the paralyzed soldiers.

DR. J. R. SHANNON has been elected surgeon-in-chief of the Manhattan Eye and Ear Hospital, New York. He was formerly of Kingston, Ontario.

DR. N. H. BEAL, associate professor of surgery of the Western University Medical School, has been granted a leave of absence for a year while acting as an assistant at the Mayo Clinic, Rochester, Minnesota.

BRITISH COLUMBIA

THERE were 1,322 patients in the provincial Mental Hospital at the beginning of August and 1,339 at the end of the month, during which time sixty-three were admitted, seven returned from probation, nine were discharged, six died, and seven escaped.

The Balfour Sanitarium for the treatment of pulmonary tuberculosis has been changed from a military to a civilian hospital. In every respect the work will be carried on as before only all military routine will be avoided. At the present time Captain Olson is on indefinite leave of absence from the C.A.M.C. and is acting in a civilian capacity at the Sanitarium as the medical superintendent in charge.

VANCOUVER despatched an anti-tubercular exhibit, the property of the city, in charge of two nurses, to the Jubilee Fall Fair of the Cowichan Agricultural Society held at Duncan recently. Arrangements were made for the holding of a mass meeting during the fair, at which illustrated health lectures were given. Dr. Young, secretary of the provincial health board, gave an address on hygiene.

DR. C. DENTON HOLMES, medical health officer of the Saanich School Board, has tendered his resignation owing to pressure of work in connection with the Invalided Soldiers' Commission.

ARMY MEDICAL SERVICES

THE following have been placed on Reserve of Officers from the personnel of the C.A.M.C. for civilian duty as stated:

Board of Pension Commissioners: Lieutenant-Colonel J. L. Biggar, Victoria, B.C.; Major D. McLaughlin, Calgary, Alberta; Captain B. F. Keillor, Dundee, Ontario; Captain A. E. Hilker, Hamilton, Ontario; Captain E. H. Orok, Winnipeg, Manitoba.

Invalided Soldiers' Commission: Major E. E. Latta, Colborne, Ontario; Captain G. W. Howland, Toronto, Ontario; Captain G. G. Stewart, Camrose, Alberta.

C.A.M.C. Appointments: Lieutenant-Colonel D. McGillivray (Toronto) has requested to be relieved of his duties on the Board

of Consultants. He is to be replaced by Lieutenant-Colonel Parsons (Surgeon to the Sick Children's Hospital), Toronto.

Colonel K. Cameron becomes O.C. St. Anne de Bellevue Military Hospital. Lieutenant-Colonel C. E. Doherty becomes A.D. M.S. at Victoria, B.C. Lieutenant-Colonel J. A. Grant, P.A.M.C. is appointed to the Board of Revision, Ottawa. Lieutenant-Colonel J. M. Gunn becomes D.A.D.M.S., Calgary, Alberta. Captain C. M. Prett becomes D.A.D.M.S. (Sanitation) at St. John, N.B. Captain E. H. Young becomes O.C. Ontario Military Hospital, Cobourg, Ont. Captain G. W. Armstrong assumes command of the A.M.C. Depot at Toronto. Captain G. D. Gordon assumes command of the Petawawa Camp Hospital. Major C. E. Fortin becomes officer in charge of Venereal Disease, Winnipeg. Colonel F. S. L. Ford for duty at Militia Headquarters, Ottawa. Major R. L. Miller becomes D.A.D.M.S. at Victoria, B.C. Colonel L. E. W. Irving replaces Lieutenant-Colonel Ryerson as A.D.M.S. at Toronto. The latter retires to assume his duties at Toronto University. Lieutenant-Colonel McVicar becomes Senior Physician at Spadina Military Hospital. Lieutenant-Colonel O. A. Cannon replaces Lieutenant-Colonel Grant as A.D. M.S. at London. Major J. J. Ower becomes Pathologist to Ste. Anne Military Hospital. Captain H. R. Mustard becomes D.A. D.M.S. (Hospitals) at Vancouver. Lieutenant Edward Mountjoy Pearse, C.A.M.C., has been appointed for duty with the Victoria Military Hospital. Lieutenant Campbell Davidson, C.A. M.C., has been appointed for duty at Qualicum Military Hospital.

DR. J. MAIR ROBERTSON will cease to be a member of the Medical Board Centre, Vancouver, B.C.

MAJOR H. V. COATES, C.A.M.C., will cease to be attached to the Vancouver Military Hospital for duty and will perform the duties of Sanitation Officer for the Vancouver Military area.

THE following medical officers have been appointed to proceed with the Canadian Siberian Force: A.D.M.S., Colonel J. T. Clarke, C.A.M.C. D.A.D.M.S., Major T. Morrison, C.A. M.C.

16th Canadian Field Ambulance: Lieutenant-Colonel C. A. Warren, Majors G. A. Winters, W. M. Carrick, Captain C. A. Marlatt, Lieutenants S. A. Wallace, W. G. Bowles, M. C. Adamson, G. C. Kenning, H. W. Elkington, H. E. Skeete, R. R. Struthers, Captain W. J. Warden (Q.M.).

11th Canadian Stationary Hospital: Colonel J. L. Potter, Major F. A. Cleland, Captains F. J. Scully, J. F. C. Colling, J. H. Box, G. L. Sparks, W. T. Kennedy, A. M. Savoie, G. H. Lansown, N. Morin, J. Race; Lieutenants J. M. Munro, H. C. Connell, H. H. Potts; Captain H. Barratt (Q.M.).

Regimental Medical Officers: Captains J. L. King, H. R. Holme, V. H. McWilliams, A. J. Shilistra, W. R. Scott, W. G. Shepherd, L. M. Stuart, C. W. Moore.

Sanitary Section: Captain H. W. Lewis.

Returned from Overseas: Colonels F. G. Finley, L. E. W. Irving, Lieutenant-Colonels Biggar, Parsons, J. C. Meakins, T. A. Starkey, C. S. McVicar; Majors W. Creighton, J. J. Ower, A. J. Losier, H. B. Jeffs; Captains A. B. Greenwood, H. C. Pearson, W. E. Struthers, C. L. B. Stammers, J. W. McIntosh, W. R. Coles, G. H. Wade, A. A. Drinnan, E. C. Beer, G. A. Campbell, W. V. Jackson, T. B. Green, W. A. Hutton, L. W. Houghton, and F. W. Jackson.

Promotions Overseas: Major-General G. L. Foster becomes Director General Medical Services, O.M.F.C. Colonel A. E. Ross becomes Brigadier-General and D.M.S., Canadian Section at G.H.Q. Majors J. M. Nettleton, S. R. Harrison, D. A. L. Graham, C. Hunter become Lieutenant-Colonels. Captains A. B. Schinbein, J. E. Campbell, A. Blais, H. O. Boyd, H. W. Wookey.

Promotions: To be Colonel—Lieutenant-Colonel J. A. Gunn, Winnipeg; Majors W. A. Gardnor, P. K. Menzies, E. V. Hogan, W. M. Hart, T. H. MacDonald, W. H. K. Anderson, N. B. Gwynn, H. H. Moshier. To be Major—Captains F. W. Tidmarsh, R. Pearse, J. J. Thompson, R. L. Miller, T. Morrison and A. J. Swan.

CAPTAIN HARRY WHYTOCK, C.A.M.C., was invested with the Military Cross by the King recently, at Buckingham Palace.

NURSING SISTER BESSIE MITCHELL was decorated by the King with the Royal Red Cross. Nursing Sister May Whittaker was decorated with The Order of the British Empire, and also honoured by having her name appear in the Birthday List.

THE Military Cross has been awarded to Captain John Gagen Lee, now of the Imperial Army, formerly of the C.A.M.C., and the bar to the Military Cross to Captain George McTavish, and the second bar to the Military Cross to Captain Clarence Young, both officers of the Imperial Army, but formerly of the C.A.M.C.

THE Military Medal has been awarded to G. Broderick, C.A.M.C., and to R. Forrester, C.A.M.C.

THE following names have been brought to the notice of the Secretary of State for War for valuable services rendered: Lieutenant-Colonel W. H. Delaney, C.A.M.C.; Lieutenant-Colonel P. G. Goldsmith, C.A.M.C.; Lieutenant-Colonel (A.-Col.) L. E. W. Irving, D.S.O., C.A.M.C.; Lieutenant-Colonel K. D. Panton, C.A.M.C.; Colonel S. H. McKee, C.A.M.C.; Majors C. A. Young, S. C. Chown, C.A.M.C.; Captains C. R. Wilson, J. R. Goodall, (A.-Maj.), C.A.M.C.; other ranks, S. Serpts. (A.S.M.) F. Alden, G. K. Gray; Sergeants (A.-S. Sergeants.) H. Caunce, E. F. Hitchman, W. Hope, A. S. Roddick, W. R. Townsend, Q.M.S. (A.S.M.), F. J. Sainsbury, Pte. S. M. W. Lawler; all of the C.A.M.C.

CASUALTIES

Killed in Action

CAPTAIN T. FLECK GRAHAM, C.A.M.C., of Brantford, Ontario.
S. STREET, C.A.M.C.

Wounded

LIEUTENANT-COLONEL ERNEST RAYMOND SELBY, C.A.M.C., of Bradford.

LIEUTENANT-COLONEL A. S. DONALDSON, D.S.O., C.A.M.C., of Brockville, Ontario.

CAPTAIN J. MAYNARD, C.A.M.C., of Hamilton.

CAPTAIN W. C. MORGAN, C.A.M.C., of Arden, Ontario.

CAPTAIN J. E. BARRY, C.A.M.C., of Toronto.

CAPTAIN ALBERIC MARIN, C.A.M.C., of Montreal.

CAPTAIN S. E. HOLMES, C.A.M.C., of Crystal City, Manitoba.

CAPTAIN H. G. YOUNG, C.A.M.C., of St. Mary's, Ontario.

CAPTAIN A. M. BLAKELY, C.A.M.C., of Chatham, Ontario.

DR. J. WHITHAM, of Regina (in the combatant forces).

SERGEANT HUBERT STEPHEN, C.A.M.C., of Montreal.

BYRON F. PARSONS, C.A.M.C., of Montreal.

W. A. IRWIN, C.A.M.C., of London, Ontario.

W. A. SCOTLAND, C.A.M.C., of Erskine, Alberta.

Book Reviews

THE ERRORS OF ACCOMMODATION AND REFRACTION OF THE EYE AND THEIR TREATMENT. A HANDBOOK FOR STUDENTS. By ERNEST CLARKE, M.D., F.R.C.S., ophthalmic surgeon to the King George Hospital, etc. Fourth edition, 231 pages. Price, 6s. net. Publishers: Ballière, Tindal & Cox, 8 Henrietta Street, Covent Garden, London, 1918.

Mr. Clarke's little handbook deserves the fourth edition which it has now reached. The work is sound and clearly written, and can be cordially recommended as an introduction to the subject of which it treats.

Books Received

THE following books have been received and the courtesy of the publishers in sending them is duly acknowledged. Reviews will be made from time to time of books selected from those which have been received.

HYGIENE FOR NURSES. By NOLIE MUMEY, M.D., lecturer in hygiene, chemistry, and bacteriology, Logan H. Roots Memorial Training School. 151 pages, 75 illustrations. Price, \$1.25. Publishers, C. V. Mosby Company, St. Louis; McAinsh & Co., Ltd., Toronto, 1918.

NURSING IN DISEASES OF CHILDREN. By CARL G. LEO-WOLF, M.D., chief of Clinic for Sick Babies and Children for the Health Department of the City of Buffalo, N.Y. 305 pages, 72 illustrations. Price, \$2.50. Publishers: C. V. Mosby Company, St. Louis; McAinsh & Co., Ltd., Toronto, 1918.

SURGICAL AND WAR NURSING. By A. H. BARKLEY, M.D., M.C., F.A.C.S., lecturer at Good Samaritan Hospital Training School for Nurses. 201 pages, 79 illustrations. Price, \$1.75. Publishers: C. V. Mosby Company, St. Louis; McAinsh & Co., Ltd., Toronto, 1918.

THE AMERICAN HOSPITAL OF THE TWENTIETH CENTURY. A treatise on the development of medical institutions, both in Europe and in America, since the beginning of the present century. By EDWARD F. STEVENS, architect, member of American Institute of Architects. 274 pages, illustrated. Architectural Record Publishing Company, New York, 1918.

A TEXT-BOOK OF PHYSIOLOGY FOR NURSES. By WILLIAM GAY CHRISTIAN, M.D., professor of anatomy, Medical College of Virginia, and CHARLES C. HASKELL, M.A., M.D., professor of physiology and pharmacology, Medical College of Virginia. 163 pages, illustrated. Price, \$1.75. Publishers: C. V. Mosby Company, St. Louis, 1918.

ANATOMY OF THE HUMAN BODY. By HENRY GRAY, F.R.S., fellow of the Royal College of Surgeons. Twentieth edition, thoroughly revised and re-edited by WARREN H. LEWIS, B.S., M.D., professor of physiological anatomy, Johns Hopkins University, Baltimore. 1246 pages, illustrated; with 1247 engravings. Price, \$7.50 cloth, \$9.00 leather. Publishers: Lea & Febiger, Philadelphia and New York, 1918.

CONCERNING SOME HEADACHES AND EYE DISORDERS OF NASAL ORIGIN. By GREENFIELD SLUDER, M.D., clinical professor and director of the department of laryngology and rhinology, Washington University Medical School, St. Louis. 272 pages, 115 illustrations. Price, \$7.00. C. V. Mosby Co., St. Louis; McAinsh & Co., Limited, Toronto, 1918.

THE WASSERMANN TEST. By CHARLES F. CRAIG, A.M., M.D., Lieutenant-Colonel, Medical Corps, United States Army. Published with authority of the Surgeon General, United States Army. Illustrated with coloured plates. 239 pages. Price, \$3.00. C. V. Mosby Co., St. Louis; McAinsh & Co., Limited, Toronto, 1918.

MILITARY SURGERY OF THE ZONE OF THE ADVANCE. By GEORGE DE TARNOWSKY, M.D., F.A.C.S., surgeon to Cook County and Ravenswood Hospitals, Chicago. Illustrated. Price, \$1.50. Publishers; Lea & Febiger, Philadelphia and New York, 1918.

PREPARING FOR WOMANHOOD. By EDITH B. LOWRY, M.D., 175 pages. Price, \$1.00. Publishers: Forbes & Company, Chicago, 1918.

A TREATISE ON CYSTOSCOPY AND URETHROSCOPY. By GEORGES LUYSS, M.D., Paris, translated and edited by ABR. L. WOLBARST, M.D., New York. 217 illustrations, 24 chromo-typographic plates and 76 original drawings. 386 pages. Price, \$7.50. C. V. Mosby Co., St. Louis; McAlinsh & Co., Limited, Toronto, 1918.

LABORATORY METHODS OF THE UNITED STATES ARMY. Compiled by the Division of Infectious Diseases and Laboratories Office of the Surgeon-General, War Department, Washington. Price, \$1.50. Publishers: Lea & Febiger, Philadelphia and New York, 1918.

Medical Societies

THE ALBERTA MEDICAL ASSOCIATION

THE thirteenth annual meeting of the Alberta Medical Association was held in Edmonton from September 25th to 27th at the University of Alberta. The attendance was the largest on record, eighty-five having registered, in addition to which, a number of visitors were present.

In addition to the papers presented, which were of exceptional value and interest, the Association was favoured during the convention by the attendance of Lieutenant-Colonel Starr and Lieu-

tenant-Colonel Wilson, of the C.A.M.C. Consultant Board, both of whom made very interesting addresses on war surgery. Lieutenant-Colonel Gunn of Calgary also gave an address on Implements, Offensive and Defensive, showing a great variety of war trophies, at the dinner tendered the delegates by the Edmonton Rotary Club. The public meeting was addressed by Dr. Stewart of the Ninette Sanitarium on Tuberculosis, which meeting was also briefly addressed by Mayor Evans; the Hon. George P. Smith, Minister of Education; Hon. J. R. Boyle, Attorney General and Hon. A. J. Mackay, who has recently been appointed Minister of Public Health.

The President, Dr. D. G. Revell, delivered his address at the dinner given by the Edmonton Academy of Medicine, and in this address called attention to some very important matters which call for serious consideration. (This address will appear in a later issue.)

Dr. A. Fisher, superintendent of General Hospital, Calgary, and Dr. T. H. Whitelaw, M.O.H., Edmonton, were elected representatives to act on the editorial staff of the CANADIAN MEDICAL ASSOCIATION JOURNAL in response to the resolution passed by the executive council of the Canadian Medical Association recently at the Hamilton meeting. Many important matters, including the Alberta Liquor Act, were discussed, and the resolutions resulting therefrom will be sent to the JOURNAL for publication at a later date.

The following papers were read: "Charlatanism," by John Park; "Child Welfare," by Mr. Bishop, Secretary Child Welfare League of Alberta; "Acidosis," by J. B. Collip; "Some Recent Advancements in Internal Medicine," by H. C. Jamieson; "Results in X-ray Therapy," by C. H. Malcolmson; "Glioma of Brain," with "Reports of Cases and Exhibits," by G. A. Anderson; "Diagnosis of Diseases of the Nervous System with Notes on Cases," by A. Fisher; "Obstetrics in Recent Literature," by Dr. Duncan; "Induction of Labour at Term," by F. W. Gershaw; "Curettage, a Dangerous Procedure," by W. A. Lincoln; "Summary of Seven Years' Medical Inspection of Schools" by D. J. Dunn; "Tuberculosis of the Kidney," by E. Allin; "Clinical Significance of Blood in the Urine," by J. S. McEachern; "Goitre Surgery and the End Results," by C. C. Tatham; "War Surgery," by Captain R. H. L. O'Callaghan; "Terminology in Medical Reports, Military Service," by Major J. A. Hislop; "Actino Mycotic Infections, with Case Reports," by

Lieutenant A. E. McCalla; "X-ray Findings," by Captain W. H. McGuffin; "Preventive Dentistry with Illustrative Slides," by C. F. Strong.

Calgary was selected as the place of meeting for 1919. Dr. G. A. Anderson of Calgary, is President-elect, and Dr. A. Fisher, of Calgary, secretary-treasurer.

SIR ALFRED YARROW, Bart., in 1916 offered his magnificent estate at Broadstairs, in Kent, to the Canadian Military Department for the accommodation of their convalescents. With the return of the property to Sir Alfred last spring, after it became undesirable to keep the men there on account of the frequency of enemy air attacks on that coast, the following acknowledgement was sent by the Minister of Overseas Military Forces of Canada:

"On behalf of the Canadian Government and the soldiers of the Overseas Military Forces of Canada, I desire to take this opportunity of thanking you most heartily for your generous action in placing your beautiful home at the disposal of the Canadian Medical Services. . . . Under the name of the Yarrow Canadian Convalescent Hospital it gave accommodation to hundreds of wounded Canadians for well over a year. . . . They will take back with them a memory of kind hospitality in this country which should go far to maintain the good feeling which is so desirable between the Mother Country and the Dominions."

